The NATIONAL GEOGRAPHIC MAGAZINE

Vol. XX NOVEMBER, 1909 No. 11

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The Temples of India

With 54 Illustrations from Photographs by W. M. Zumbro.

The Heart of the Antarctic

By Lieut. Ernest H. Shackleton. 34 Illustrations.

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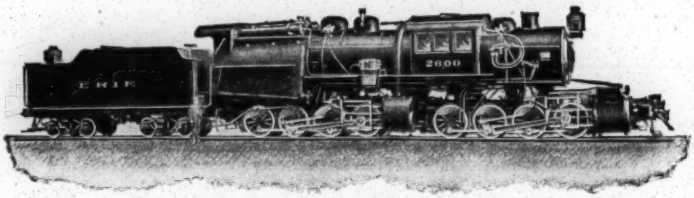

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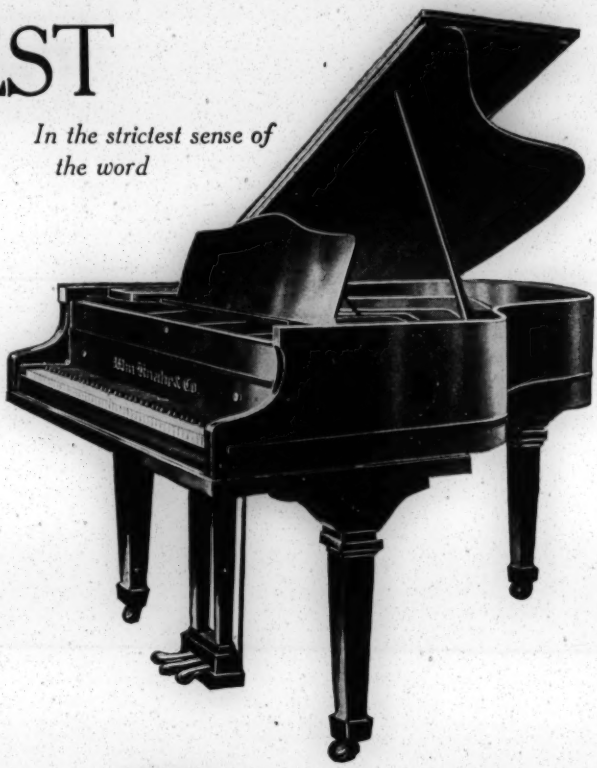

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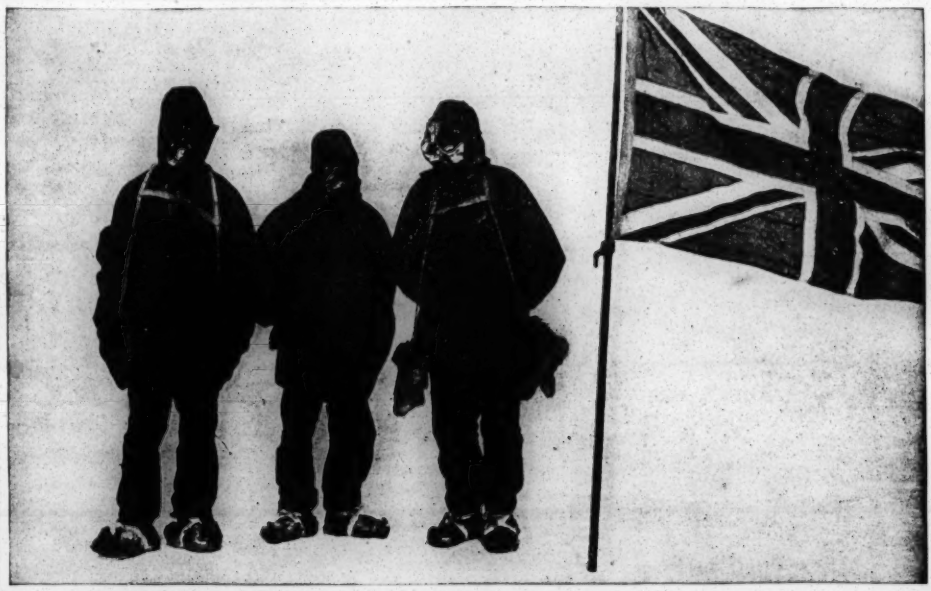
The Heart of the Antarctic



FURTHEST SOUTH—This picture was taken within 97 Geographical miles of the South Pole

Nothing could be more timely than the publication of this wonderful work by a real discoverer whose achievements have placed him on a plane with such explorers as Peary and Cook. Although his goal lay in the opposite direction, and his path led into a much less explored section, he succeeded in locating the South Magnetic Pole and came almost within sight of the South Pole.

This is the first exhaustive work on a subject that is creating a veritable sensation in all parts of the civilized world at the present time. It is not merely made up of newspaper articles and fragmentary sketches, but is Lieutenant Shackleton's OWN account of a wonderfully successful expedition, carefully planned and executed. Outside of the important scientific facts and discoveries revealed in the book, it is full of exciting adventure, wonderfully illustrated, and is undoubtedly the greatest work of exploration and travel of the year.

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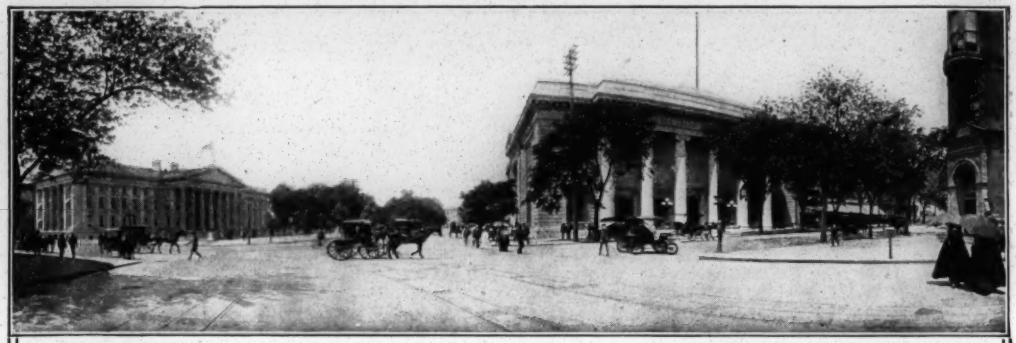

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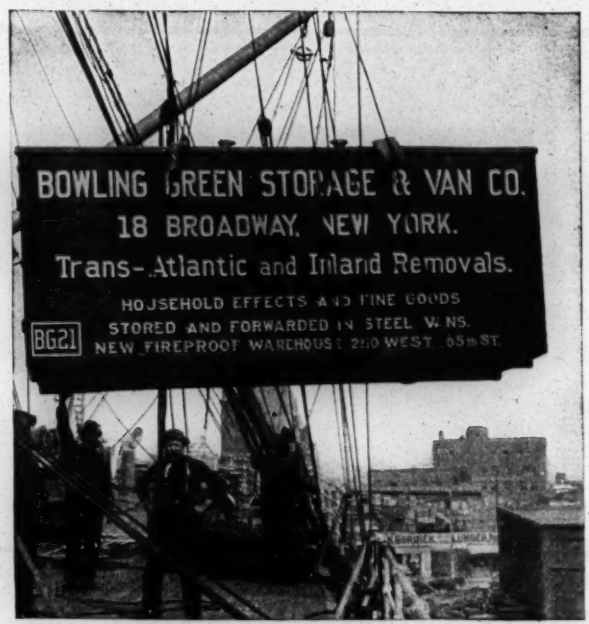
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VOL. XX, NO. 11 WASHINGTON NOVEMBER, 1909

THE NATIONAL GEOGRAPHIC MAGAZINE

THE NORTH POLE

AT a meeting of the Board of Managers of the National Geographic Society, Wednesday morning, October 20, the records and observations and proof of Commander Robert E. Peary that he reached the pole April 6, 1909, were submitted to the Society. The only question now to be decided by the association is whether or not Commander Peary reached the pole on this date, as claimed.

The records and observations were immediately referred to the Committee on Research, with the direction that the Chairman appoint a sub-committee of experts, of which he shall be a member, to examine said records and report on them to the Board. Mr Henry Gannett, Chairman of the Committee on Research, immediately appointed as the other members of the Committee Rear Admiral Colby M. Chester, U. S. Navy, and O. H. Tittmann, Superintendent of the U. S. Coast and Geodetic Survey.

This Committee of the Society will personally examine the note-books and original observations made by Commander Peary in his march to the pole, and see all the papers as brought back from the field. The Committee will report to the Board the result of its findings at a special meeting of the Board to be called for that purpose.

This action of the Society was taken in accordance with the by-laws of the Society, which provide that "The Committee on Research shall be charged with the consideration of all matters of scientific and technical geography, including exploration, which may be brought before the Society, or which may originate in the Committee; and shall report thereon to the Board of Managers, with recommendations for action."

At a meeting on October 1, the Board of Managers stated that the National Geographic Society could accept the personal statements of neither Commander Peary nor Dr Cook that the pole had been reached, without investigation by its Committee on Research or by a scientific body acceptable to it.

At the same meeting Commander Peary and Dr Cook were urged speedily to submit their observations to a competent scientific commission in the United States.

At a later meeting the Board joined in a request from the American Museum of Natural History, New York, and the American Geographical Society to President Ira Remsen that he, as the President of the National Academy of Sciences, appoint a commission to pass upon the records of Commander Peary and Dr Cook. This plan for an early examination failed, as Dr Remsen stated that he would not be able to appoint said commission unless authorized by his Council, which meets late in November, and unless also requested to do so by both Commander Peary and Dr Cook.

Commander Peary was willing to abide by such a commission, but Dr Cook stated that his observations would go first to the University of Copenhagen. In view of

the fact that Commander Peary had been waiting since his return to submit his records to a scientific commission in the United States, the National Geographic Society believed it should receive his papers now in order that his claim of having reached the pole may be passed upon without further delay.

The Society is ready to make a similar examination of Dr Cook's original observations and field notes, but as he promised to send them to the University of Copenhagen, and the Society will not have an opportunity of seeing them for probably some months, it did not seem fair to defer action on Commander Peary's observations until Dr Cook's papers were received by the Society. The only question now to be decided by the Society is whether or not Commander Peary reached the pole on April 6, 1909.

The following cablegram has been received by the Society from the University of Copenhagen, in reply to the Society's request that the University of Copenhagen waive its first claim to Dr Cook's records, in order that the records might be immediately examined in the United States and considerable delay avoided:

"OCTOBER 20, 1909.
NATIONAL GEOGRAPHIC SOCIETY,
WASHINGTON.
University regrets not able comply with your request.
TORP, *Rektor.*"

Mr Henry Gannett, Chairman of the Committee which will report on Commander Peary's observations, has been Chief Geographer of the U. S. Geological Survey since 1882; he is the author of "Manual of Topographic Surveying," "Statistical Atlases of the Tenth and Eleventh Censuses," "Dictionary of Altitudes," "Magnetic Declination in the United States," Stanford's "Compendium of Geography," and of many government reports. Mr Gannett is Vice-President of the National Geographic Society, and was one of the founders of the Society, in 1888.

Rear Admiral Colby M. Chester, U. S. Navy, was graduated from the U. S. Naval Academy in 1863. He has held practically every important command under the Navy Department, including Superintendent of the U. S. Naval Observatory, Commander-in-Chief Atlantic Squadron, Superintendent of the U. S. Naval Academy, Chief of Hydrographic Division, U. S. Navy. Admiral Chester has been known for many years as one of the best and most particular navigators in the service.

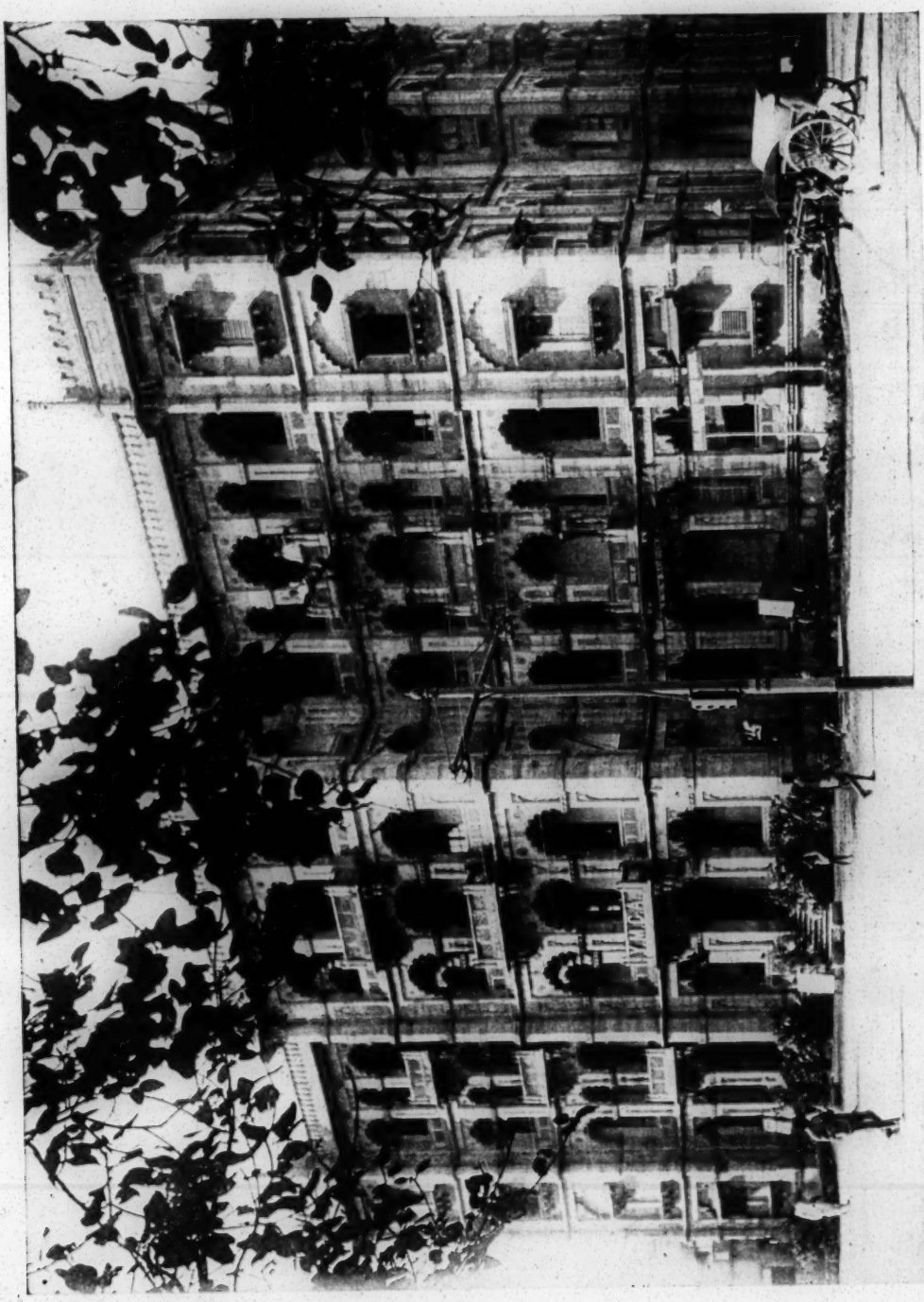
O. H. Tittmann has been Superintendent of the U. S. Coast and Geodetic Survey since 1900. He is the member for the United States of the Alaskan Boundary Commission, and was one of the founders of the National Geographic Society.

THE TEMPLES OF INDIA

FROM PHOTOGRAPHS BY W. M. ZUMBRO

THE home of the Y. M. C. A. in Bombay (picture number 1) is one of the many splendid buildings in that city of magnificent European structures, an adaptation of Indo-Saracenic to modern municipal architecture. Its size shows the scale on which the work is carried on and the support it has in the western capital and metropolis of India.

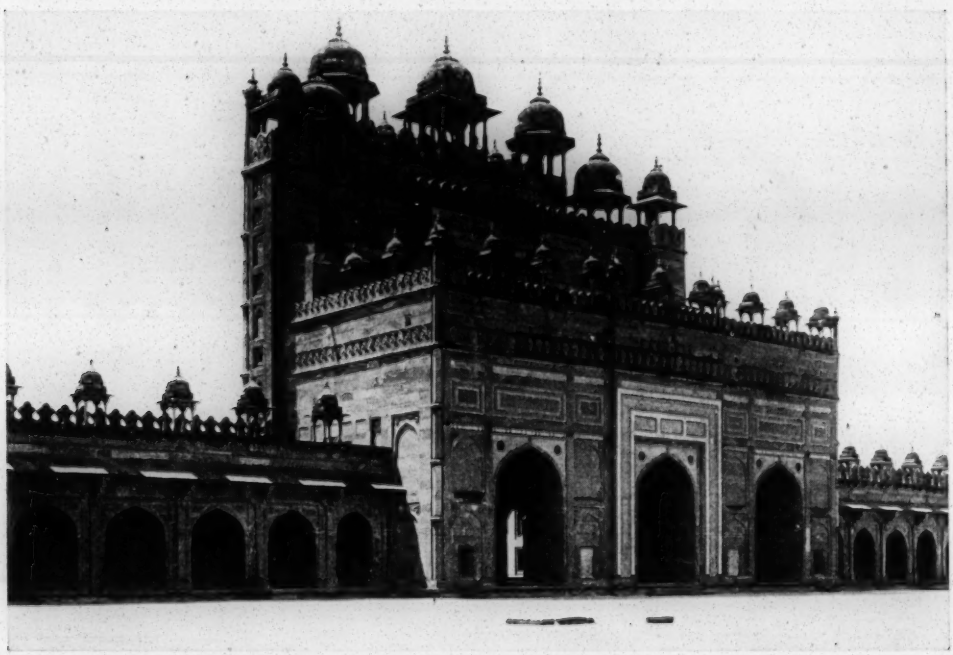
2. Nasick, mentioned by Ptolemy, is one of the sacred centers of India, situated on the banks of the sacred river, the Godavari, which is there bordered with temples and terraced stairways, as at Benares, and where also the pilgrims battle by tens of thousands at every sunrise. Its ghati, or stairways, are always picturesque with Hindus from every part of the peninsula—priests, nobles, fakirs, and beggars. A large Christian mission station is appropriately placed in its suburbs.



I. THE Y. M. C. A. BUILDING IN BOMBAY

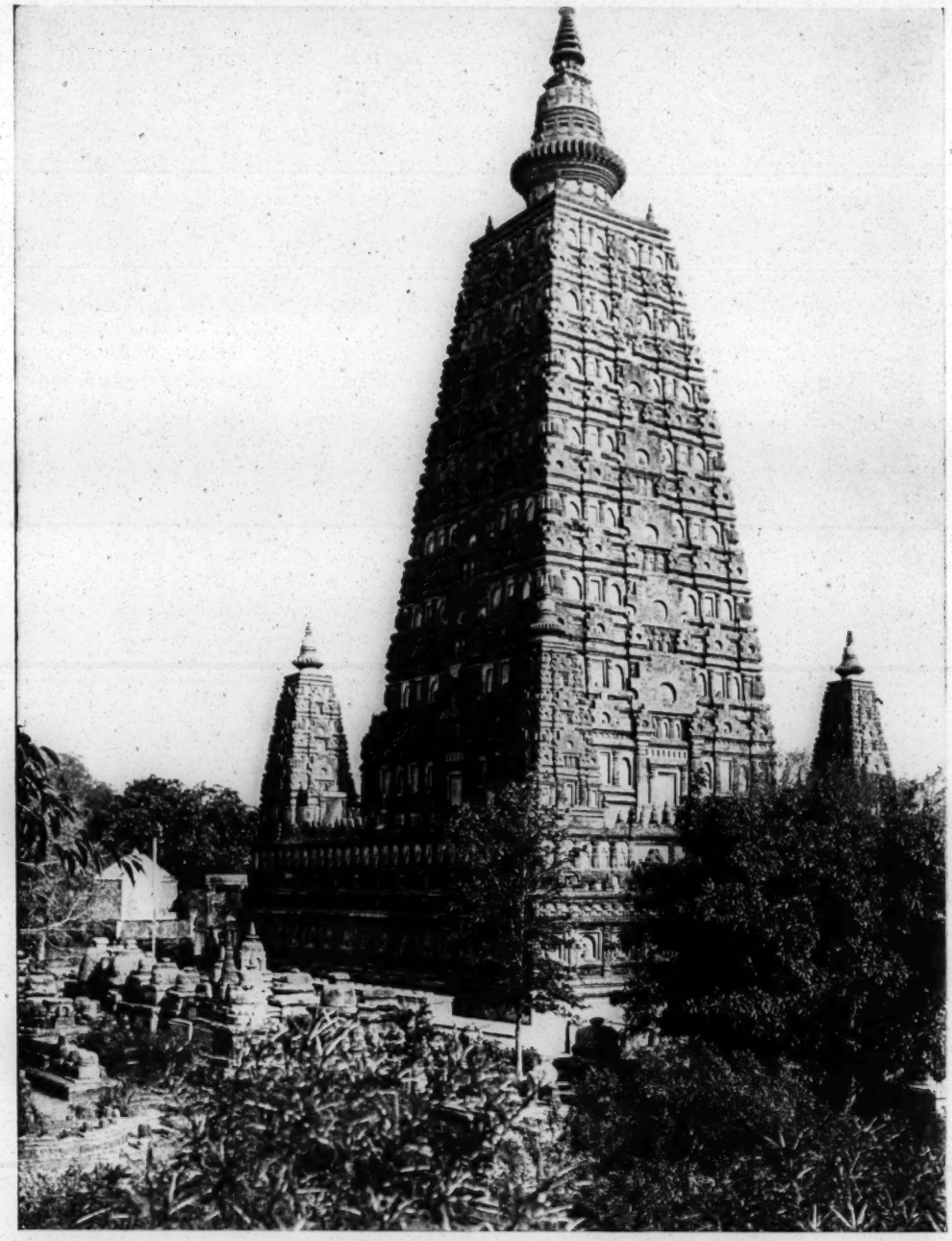
2. BOYS BEGGING AT NASICK

3. PILGRIMS BATHING IN THE SURF AT PURI



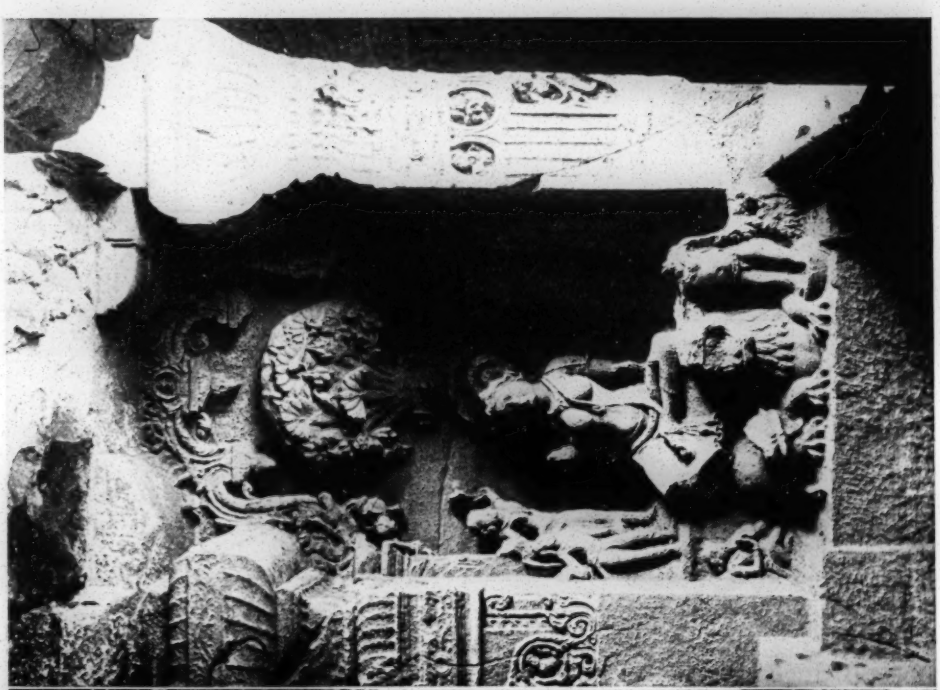
4. BROKEN PILLAR AND CAPITAL FROM SARANATH. THE BELL-SHAPED CAPITAL IS OF SYRIAN ORIGIN

5. THE MUSIC HALL AT DELHI

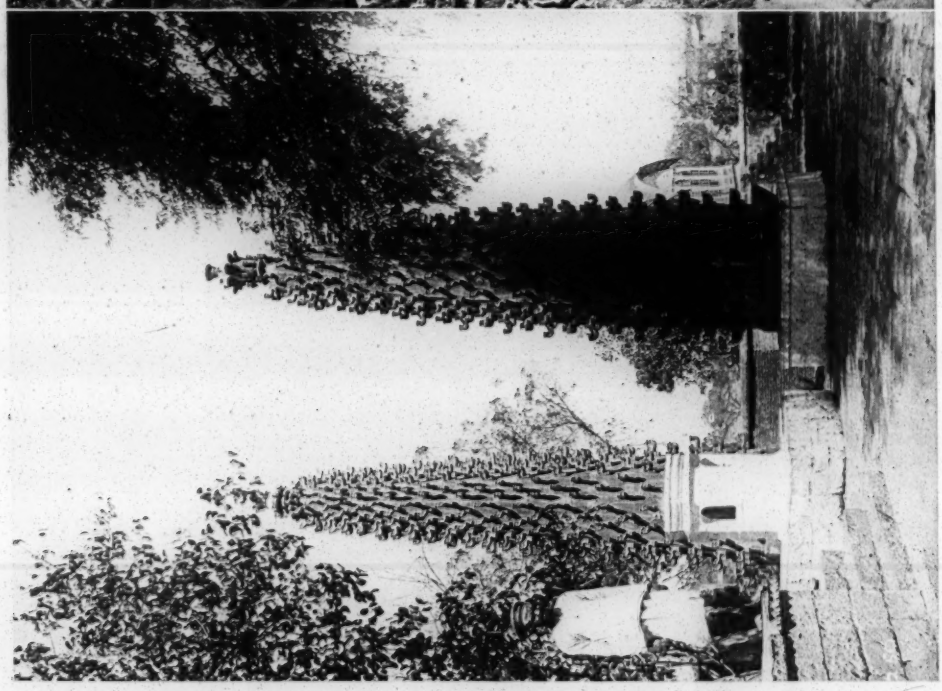


6. THE GREAT TEMPLE AT BUDDHA GAYA

7. A PART OF THE BUDDHIST RAILING FROM THE TOPE AT BHARHUT, NOW IN THE CALCUTTA MUSEUM

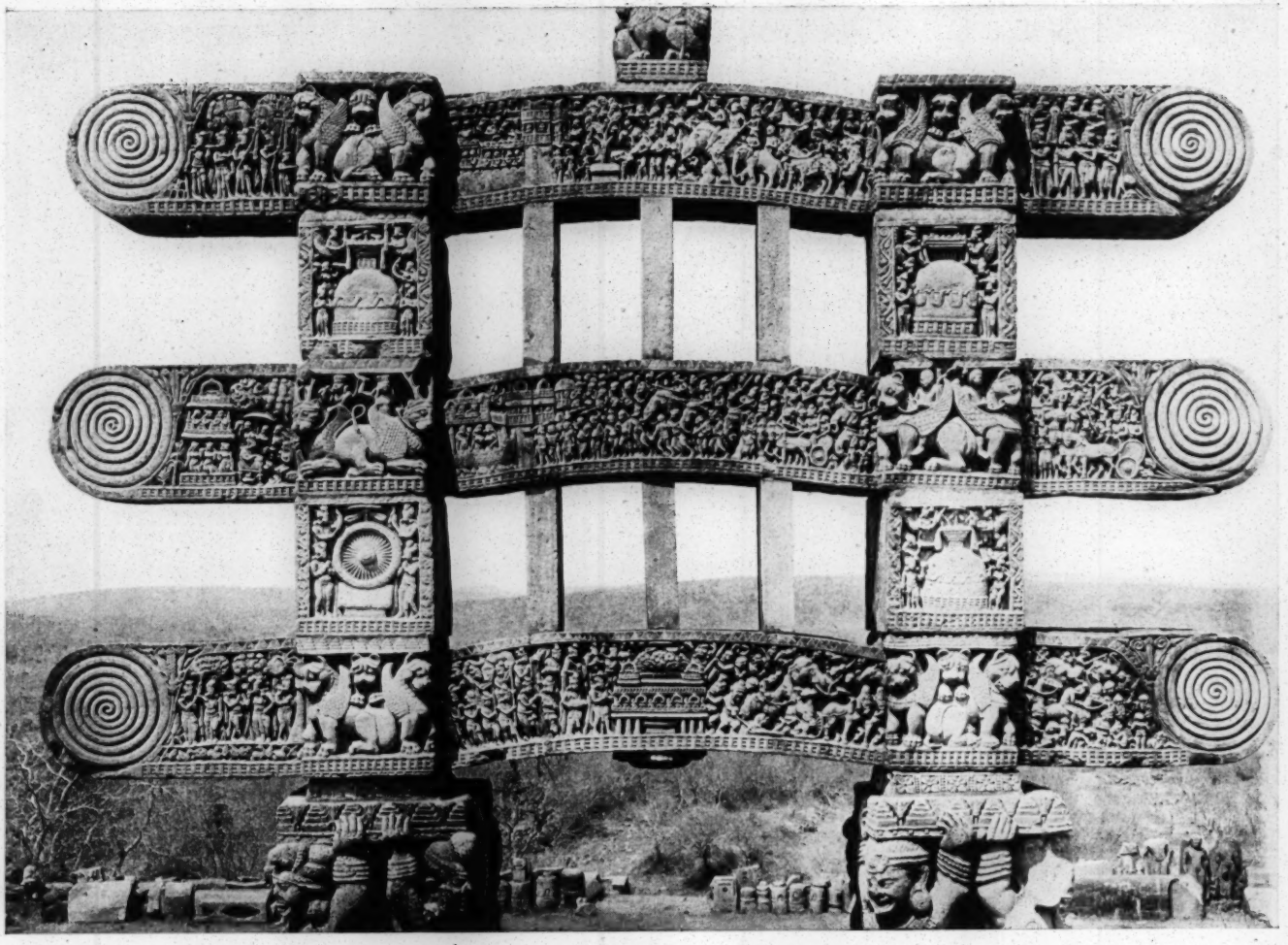


9. FIGURES CARVED ON THE ROCK-CUT TEMPLES AT UJJAIN



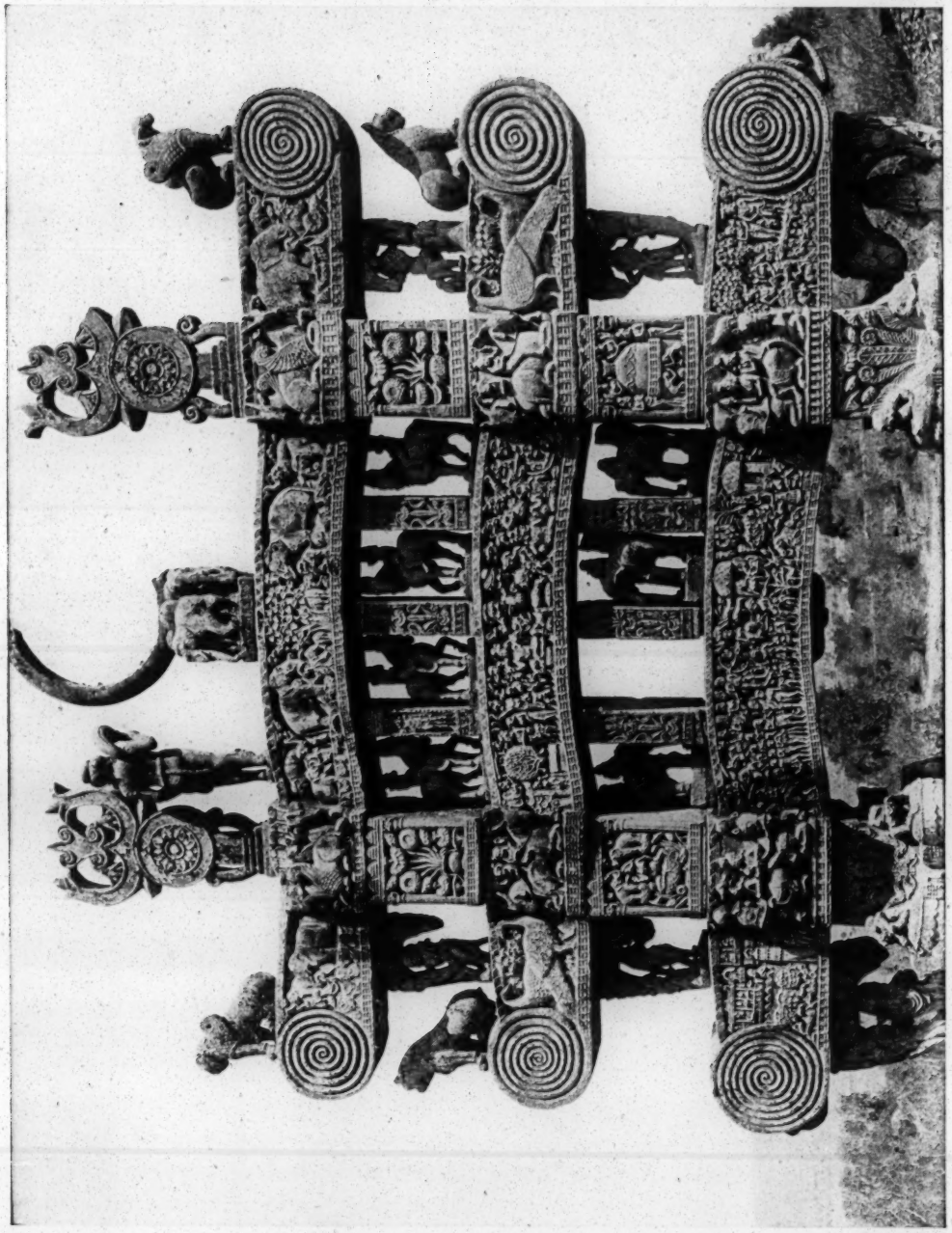
8. PILLARS ON WHICH LIGHTS ARE PLACED, UJJAIN

IO. GATEWAY TO THE TOPE AT SANCHI

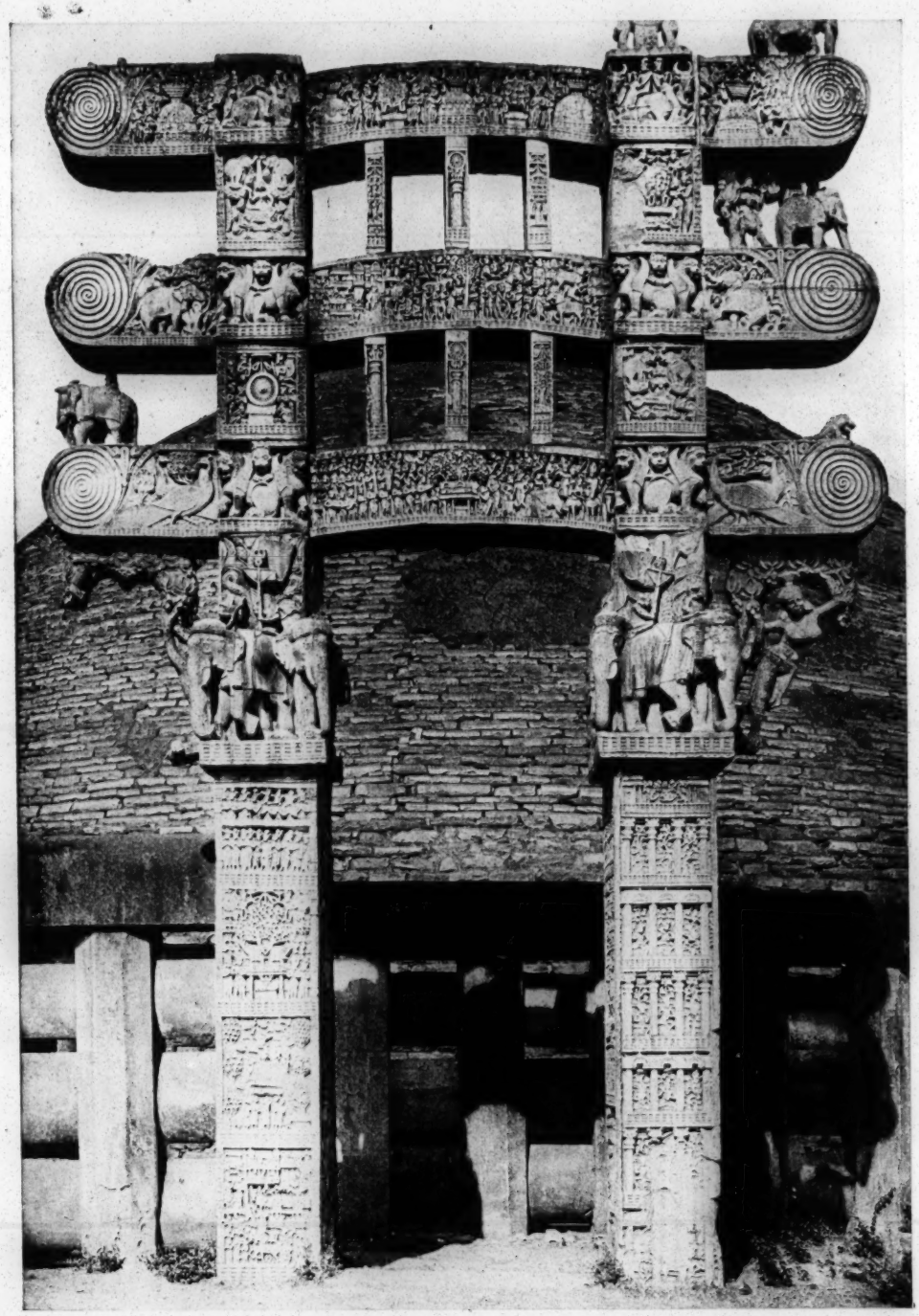


II. INNER SIDE OF THE WEST TORAN OR GATEWAY TO THE GREAT BUDDHIST TEMPLE AT SANCHI

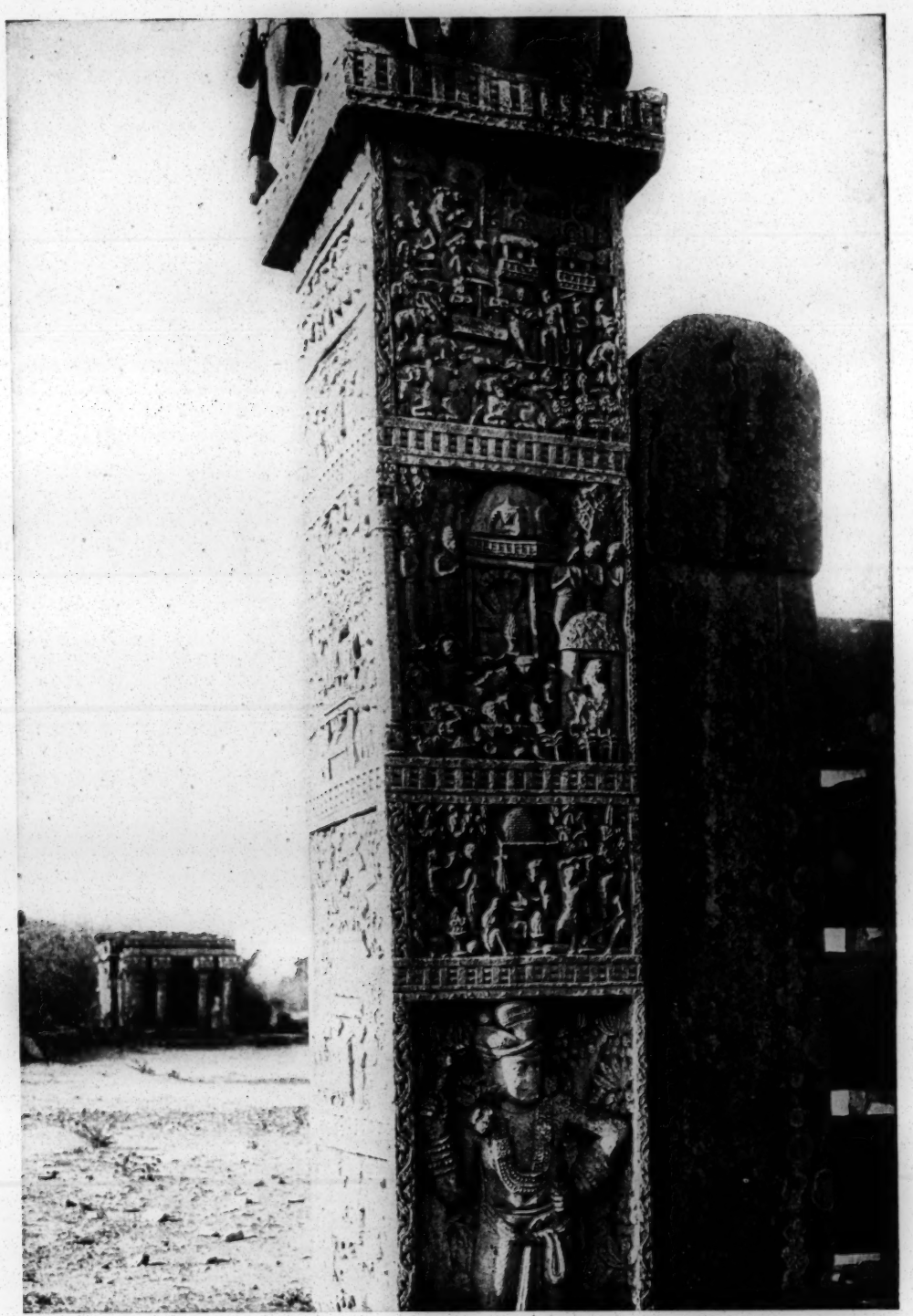
Note the multitudes of diverse figures in this and succeeding pictures



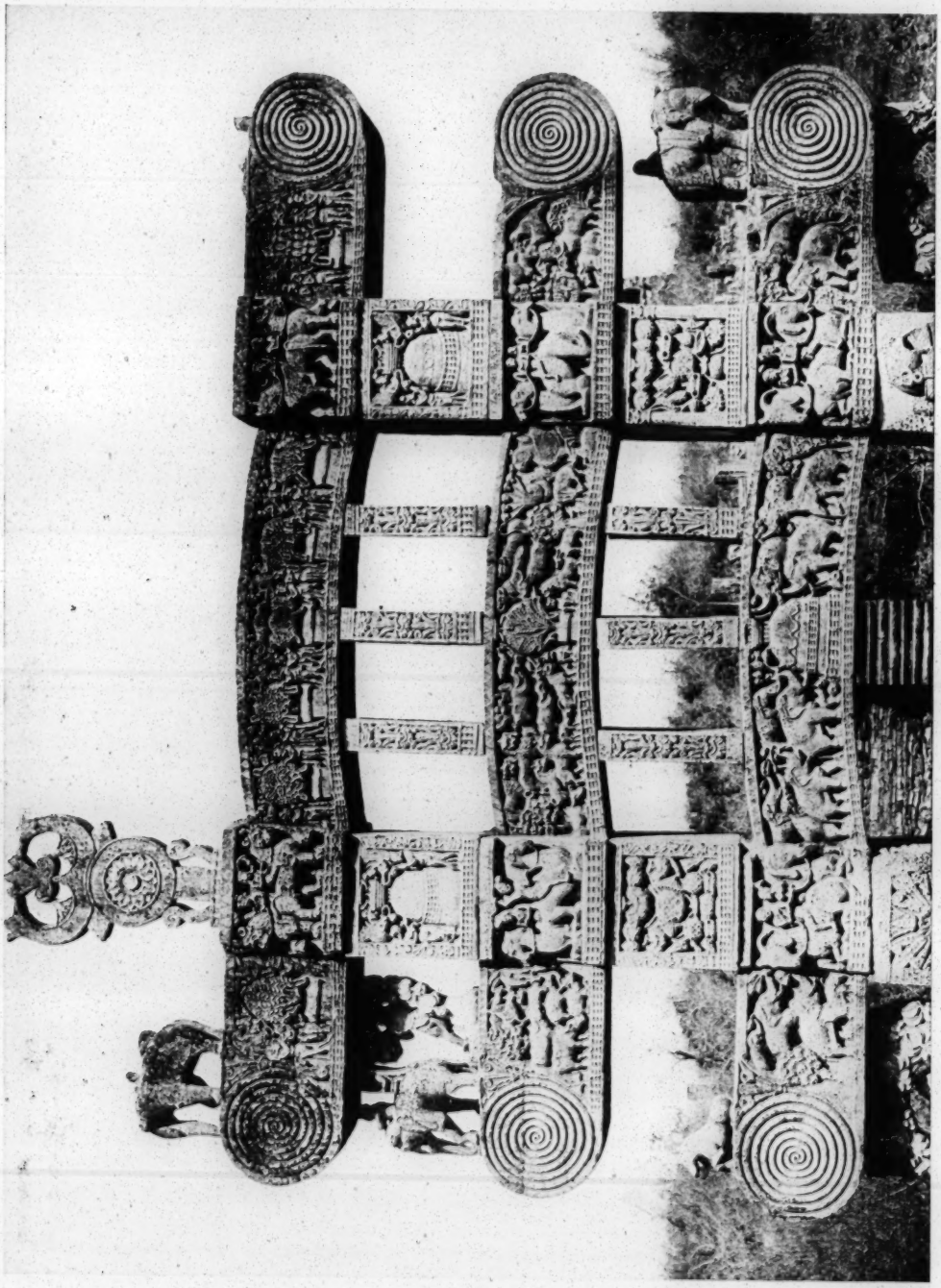
12. INSIDE OF THE NORTHERN TORAN OR GATEWAY TO THE TOPE AT SANCHI



13. OUTER SIDE OF THE EAST GATEWAY AT SANCHI



14. INNER SIDE OF THE LEFT PILLAR OF THE GATEWAY SHOWN ON PRECEDING PICTURE



15. INSIDE OF THE EAST TORAN OR GATEWAY OF THE BUDDHIST TOPE AT SANCHI (SHOWN ON NUMBERS 13 AND 14).

3. When the Jagannath festival is concluded all the pilgrims repair to the seashore, and the surf effectually washes away all sins.

4. Sarnath, once a great religious suburb of Benares, is now but a flat plain whose fields are mantled with ruins. It was the site of the Deer Park, where Gautama Buddha established himself and preached for forty rainy seasons, eventually overthrowing Brahmanism on its most sacred spot. The great tope, or memorial mound, covered with carvings and statues, was described by Fa Hian, the Chinese pilgrim, in 209 A. D., and by Hionen Thsang in 629 A D., and from their minute description the Anglo-Indian archeologists have been able to trace all those splendid edifices that filled the great walled enclosures of this famous Buddhist monastery.

5. The Nakar Khana, or Music Hall, in the fort at Delhi, stands opposite the magnificent red sandstone Lahore gate, admitting one to the great enclosure of the Mogul Emperor. One passes through the Nakar Khana to a second court to the great hall of public audience, with its jeweled inlaid throne. The music hall of red sandstone, inlaid with white marble and finished with rows of bell cupolas, held the trumpeters and musicians who welcomed and announced arrivals for great ceremonies.

6 The Great Temple of Maha Bodhi at Buddha Gaya, within one hundred miles of Benares, is the most sacred shrine of the Buddhist faith. This present temple succeeds earlier buildings, and is itself a seventh century construction. The tree at the right foreground is the Sacred Bo Tree, lineal descendant of the very same Bo Tree and occupying the same spot as the tree under which Gantama Buddha sat while he attained enlightenment. Archeology has brought to light and rescued a whole treasure-house of sculptured relics, some of which are cared for in a building beside the temple court. The original stone railing erected by Emperor Asoka around the early temple has been uncovered, and this "earliest sculptured monument in India" was precursor of the sculptured rails at other Buddhist shrines.

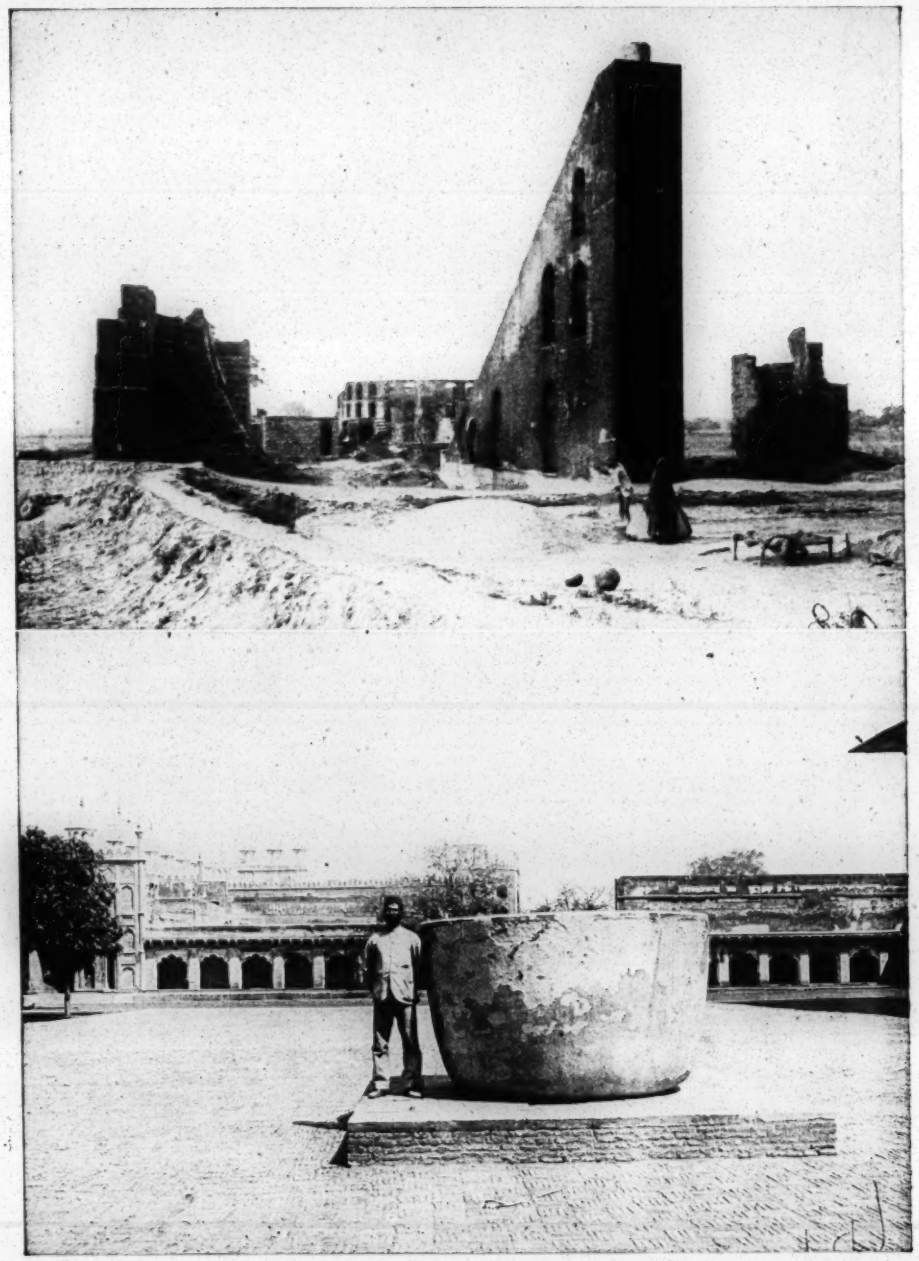
7. The sculptured railing from Bharahut, near Bhilsa, is now reërected in the Calcutta Museum, and all have opportunity to study there this wonderfully elaborate carving dating from the second century B. C. The figures illustrate scenes from the Jataka Stories.

8. Ujjain was the capital where Asoka ruled during his father's lifetime, and where later Vikramaditya ruled after he had driven the Scythians out of all northern India. He made it a center of Hindu learning and literature. The remains of the temples, after suffering at the hands of Mohammedan conquerors, show how splendid those structures were in Ujjain's prime. Number 8 shows the columns of light for festival times, when the pillars blaze from top to bottom with tiny flames.

9. Fragments of sculptured columns and figures in the rock-cut temples at Ujjain, dating from Buddhist times.

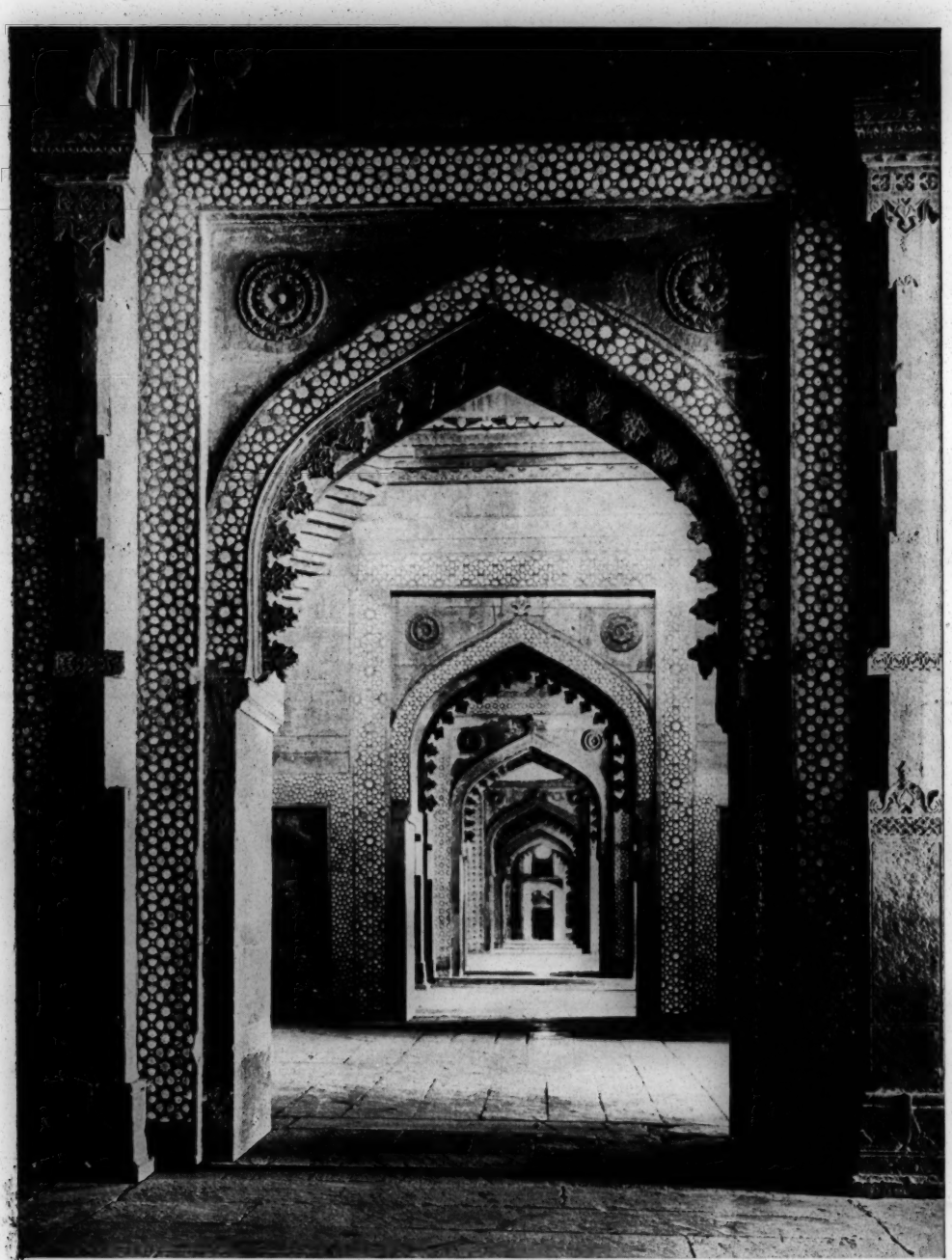
10. Exterior of Toran, or gateway in the stone rail surrounding the tope at Sanchi. The great Buddhist tope or stupa at Sanchi, or memorial mound covering relics of the Buddha, is one of the most striking relics of the great religion now remaining. The mound, 106 feet in diameter and 46 feet in height, was once entirely faced with sculptured stones. The rail was pierced by four gateways, the monumental torans a mass of wonderful carving, unequaled by anything of later date in India. This tope is believed to have been erected two centuries before Christ, its carved rail and Torans probably later. Three of the gateways remain in place, and the great stupa has been given every care by Indian archeologists. The Torans which had fallen have been set up and carefully pieced together, and one has been reërected in Calcutta, casts of which are now to be seen at the British Museum, London, and at the Musée Guimet in Paris.

11. Inner side of the west gateway of the great Buddhist tope at Sanchi. The carving is in white sandstone, and prob-



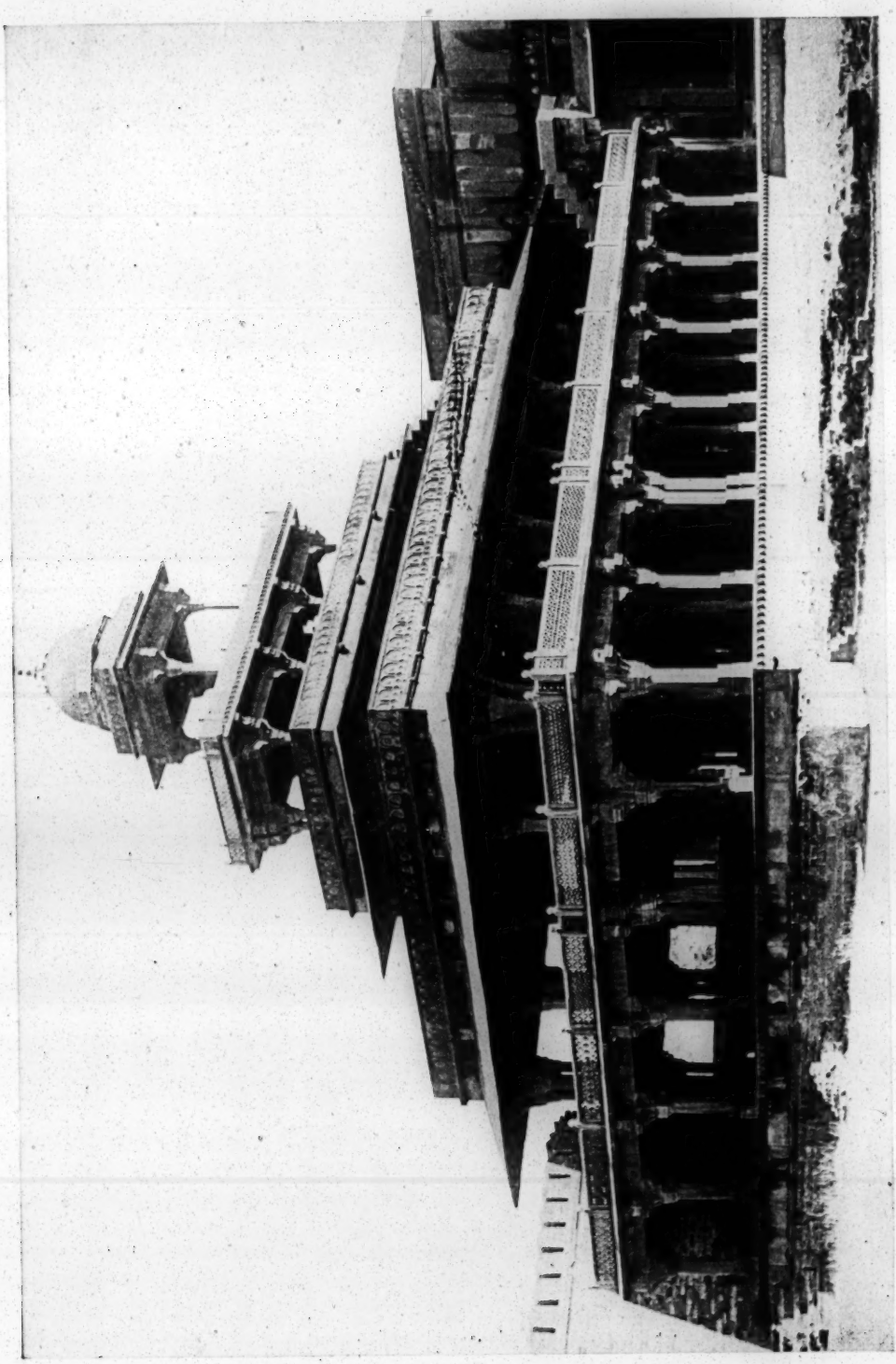
16. THE OBSERVATORY AT DELHI

17. THE BATH TUB OF THE EMPEROR JEHANGIR

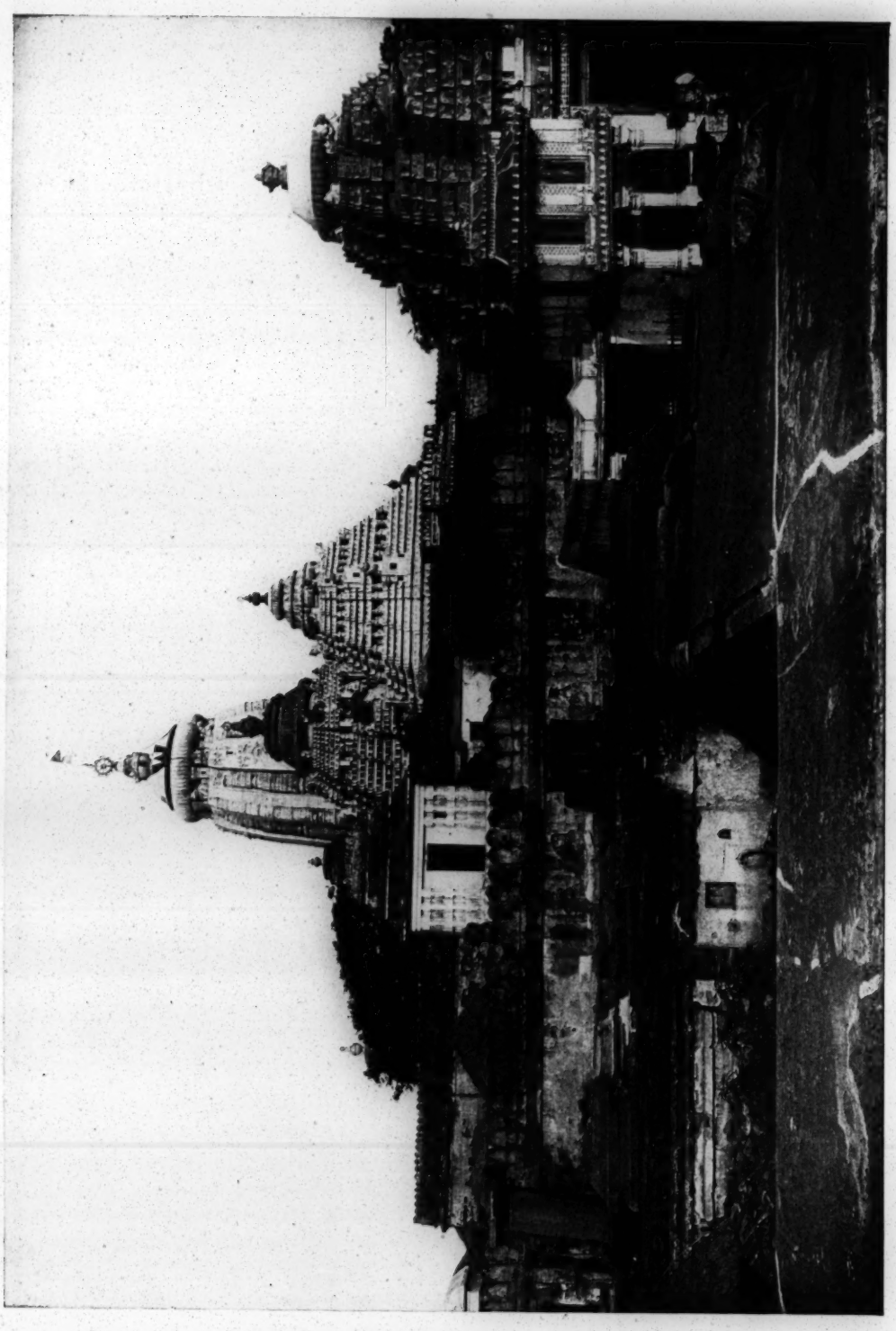


18. THE ARCHED DOORWAYS, INLAID WITH MOSAIC, OF THE MOSQUE AT FATEH PUR SIKRI

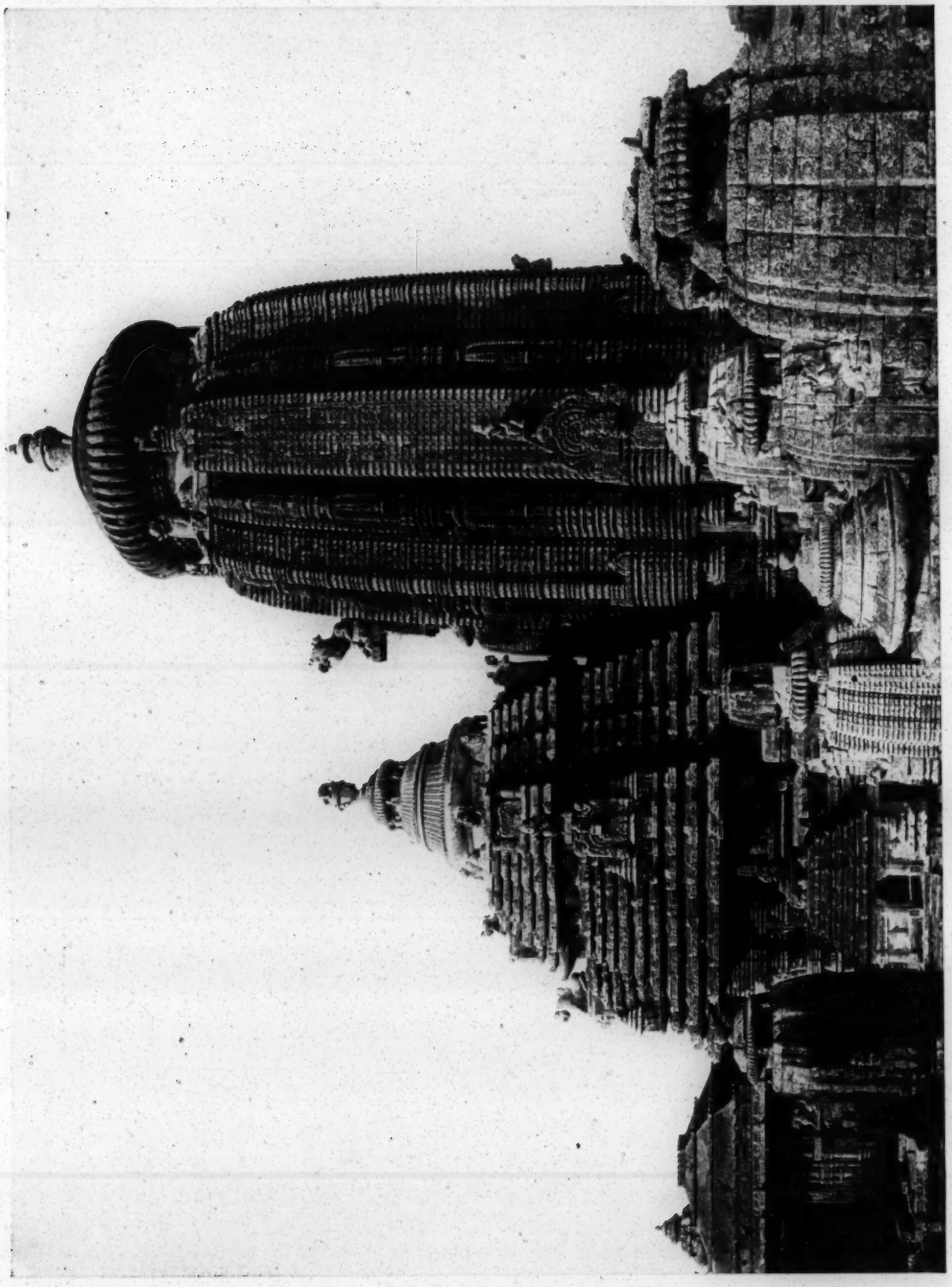
19. TOMB OF TAGLAKSHA AT TAGLAKSHABOD, DELHI



20. THE FIVE-STORIED PAVILION OR SUMMER PALACE OF THE EMPEROR AKBAR

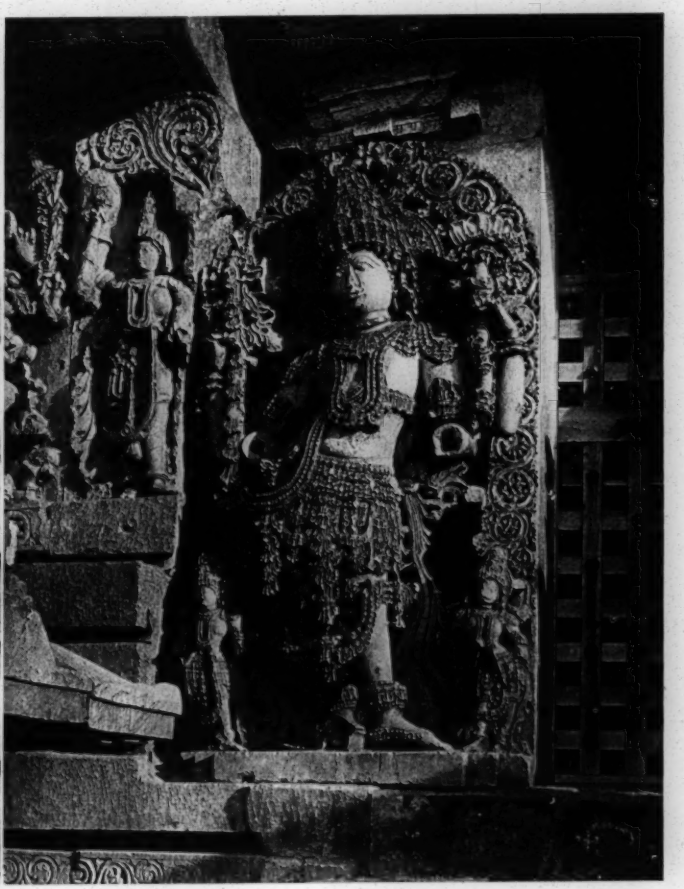


21. THE MOST FAMOUS TEMPLE OF INDIA, THE JAGANNATH AT PURI

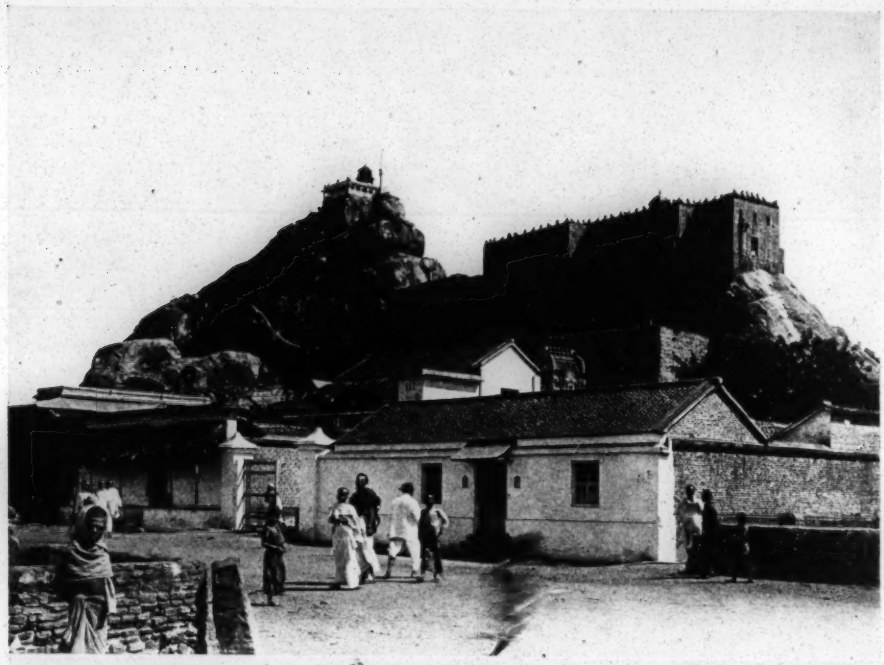


22. THE GREAT TEMPLE AT BHUVANESHWAR: EVERY INCH OF THE SURFACE OF THE GREAT TOWER IS COVERED WITH INTRICATE CARVING

23. ARCH TO THE ENTRANCE OF THE GREAT TEMPLE SHOWN IN NUMBERS 22 AND 24

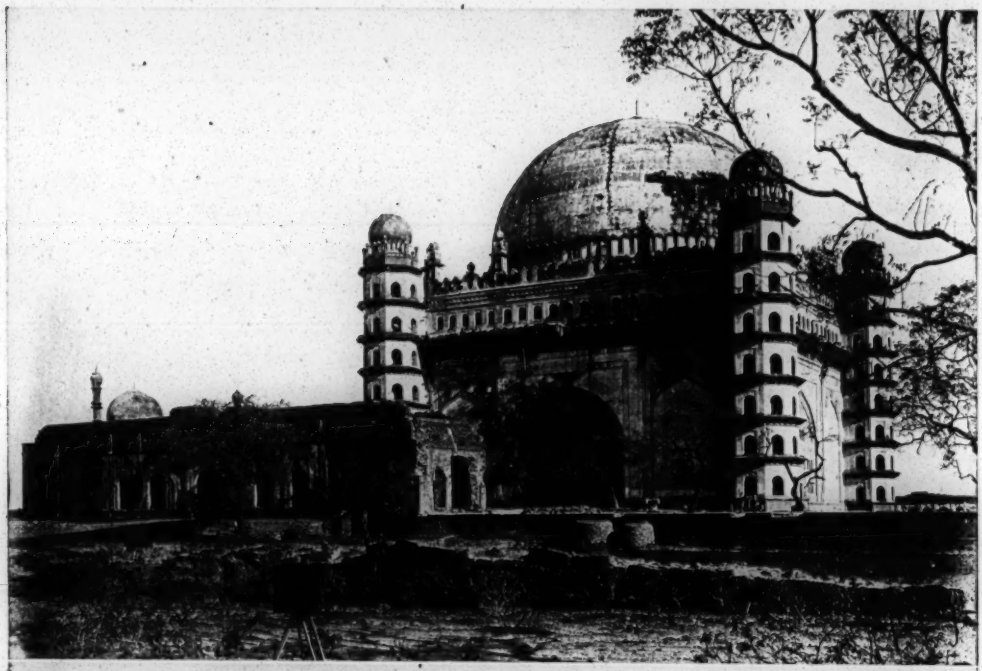


24. A WATCHMAN: TEMPLE AT BELUR



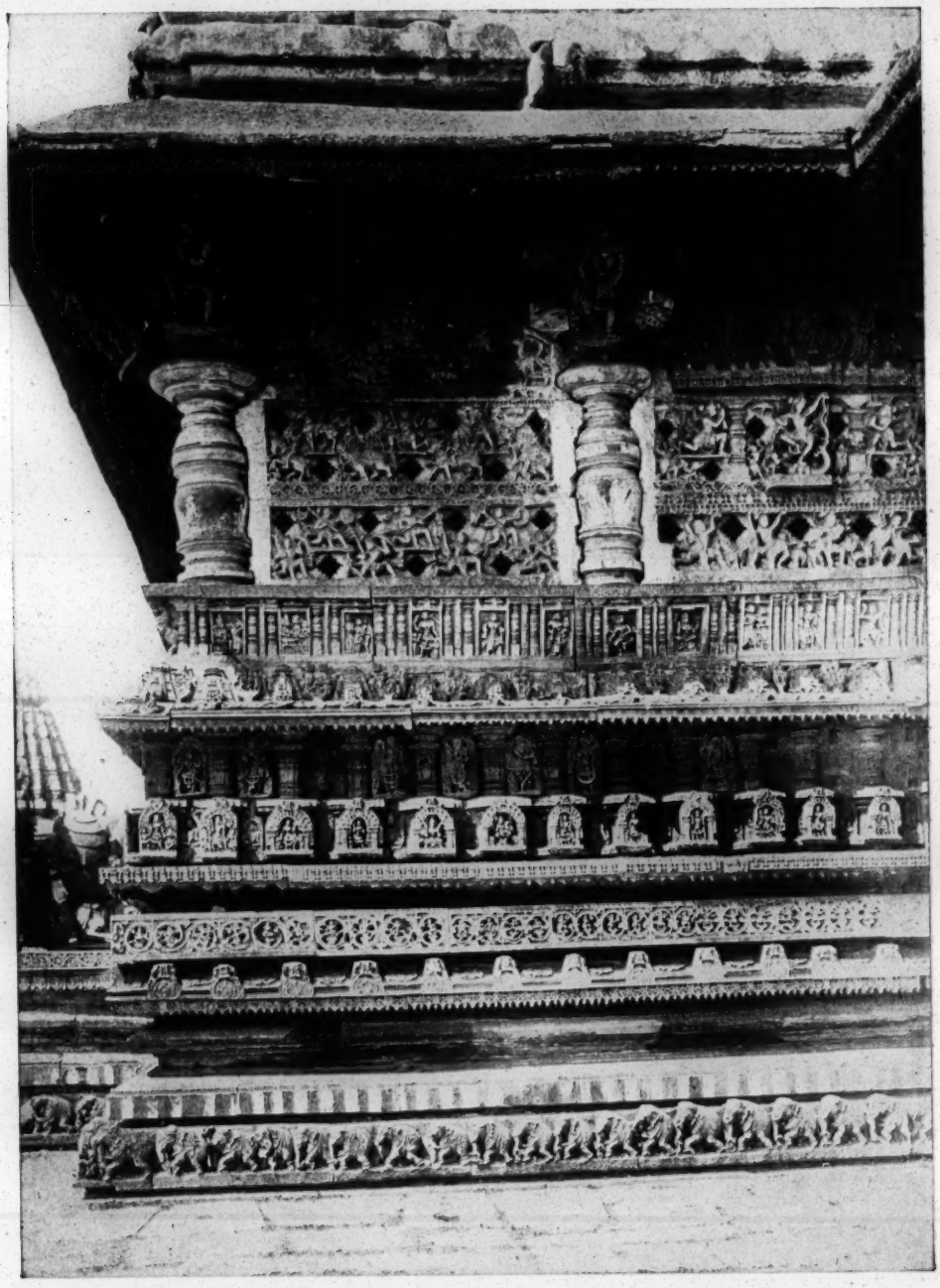
25. THE FAMOUS ROCK OF TRICHINOPLY

26. ANOTHER VIEW OF THE GREAT TEMPLE OF BHUVANESHWAR

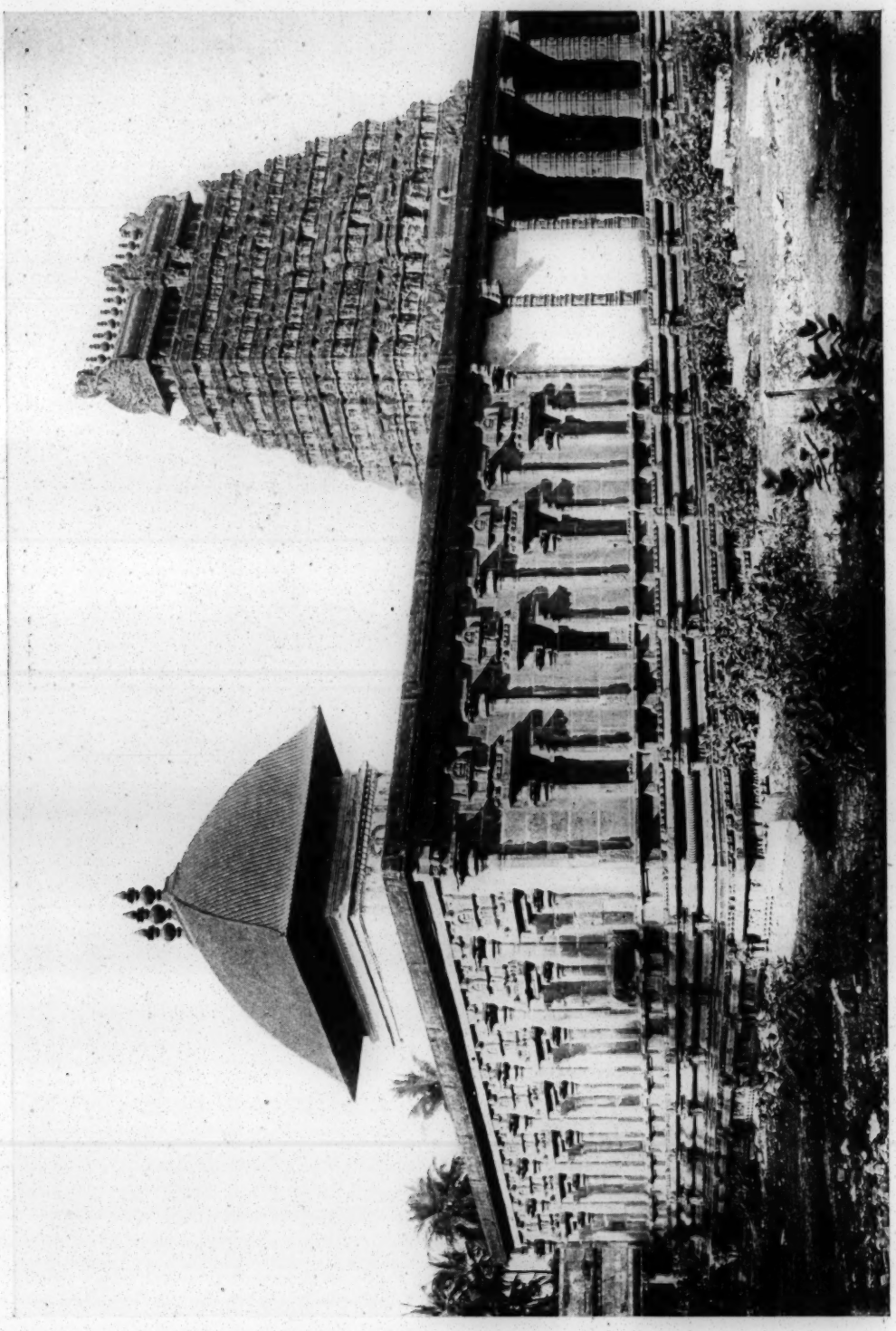


27. THE ROSE TEMPLE AT BIJOPUR

28. THE PALACE AT BIJOPUR, SUPPOSED TO CONTAIN HAIRS FROM THE PROPHET'S BEARD



29. THE MOST LABORIOUSLY WROUGHT CARVING IN THE WORLD



30. A WONDROUSLY RICH TEMPLE OF SOUTHERN INDIA, CHIDAMBARAM

31. A HINDU ASCETIC OR HOLY MAN

ably belongs to the second century A. D. The winged lions show the influence of Babylonian art.

12. Inner side of the North Toran at Sanchi.

13. Outer side of the East Toran at Sanchi.

14. Inner side of one pillar in East Toran, Sanchi, carved with scenes from the Jatakas, or Buddhist Birth Stories, the legends of early Buddhism.

15. Inner side of the East Toran, Sanchi, upper section, where all created beings are shown worshiping the sacred relics (in a tope or relic casket) and the Sacred Tree. Note how different this picture is from the others. In the middle panel of the middle arch are to be seen all sorts of animals worshiping the Sacred Tree; on the right is the garuda, to the left of which is the maha or five-headed cobra, and to the left of this two oxen with faces of men. Other mythical animals are seen in the group.

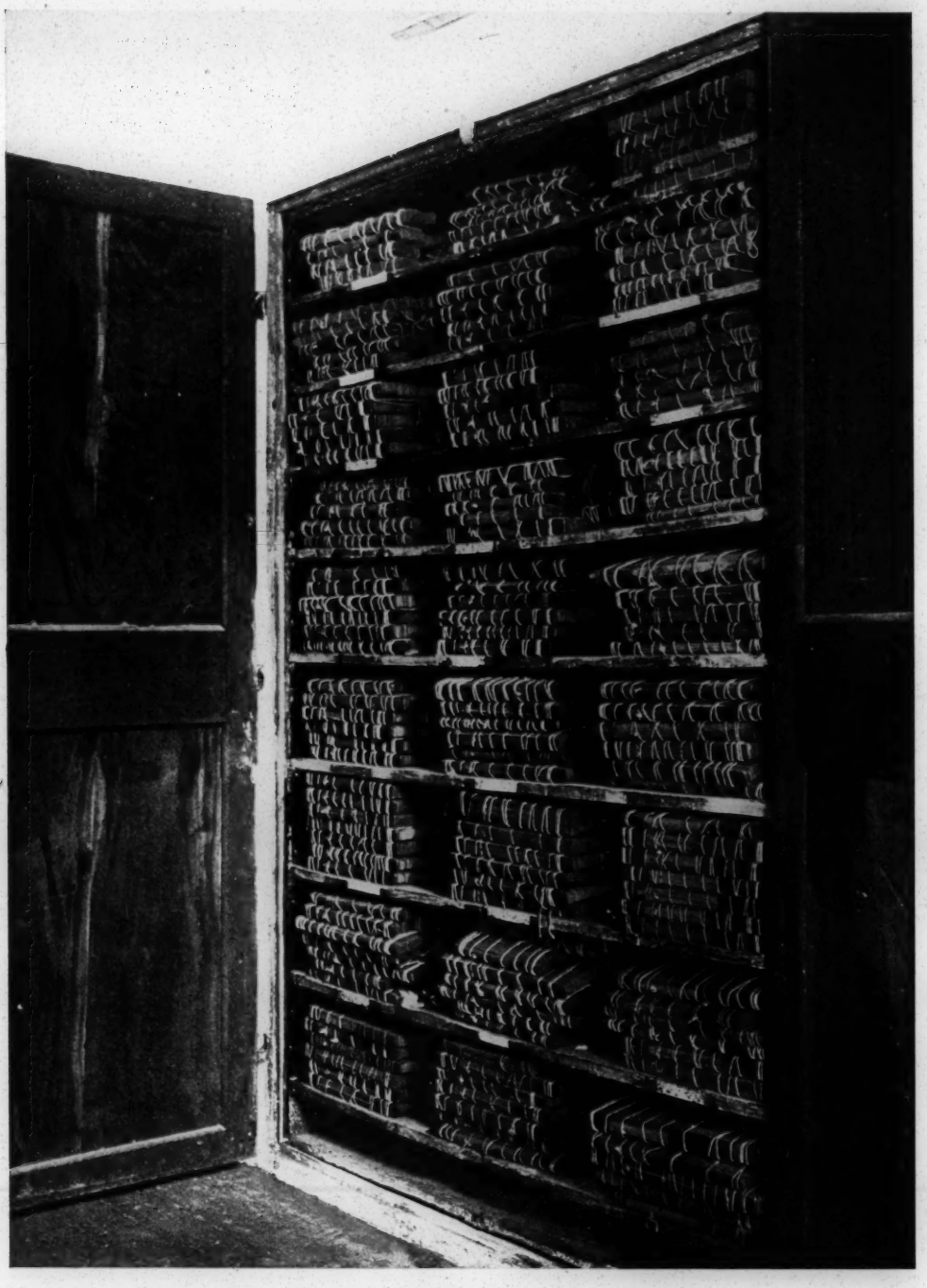
16. Jai Singh, the Rajah of Jeypore, built observatories at Delhi and Jeypore, after the plans of his own, about the year 1724. This one at Delhi is most interesting to all astronomers—an equatorial dial 56 feet high, with a base of 104 feet and a hypotenuse of 118 feet. Jai Singh was an engineer as well as a mathematician and astronomer, and his ruined observatories are his best monument.

17. The Hauz, or Bath of the Emperor Jehangir, whose son built the Taj Mahal in memory of his wife, is an immense cistern of light-colored porphyry which stands in the center of the great court or armory square of the fort at Agra. It is 5 feet high and 8 feet in diameter and formerly stood in one of the inner courts of the adjoining palace.

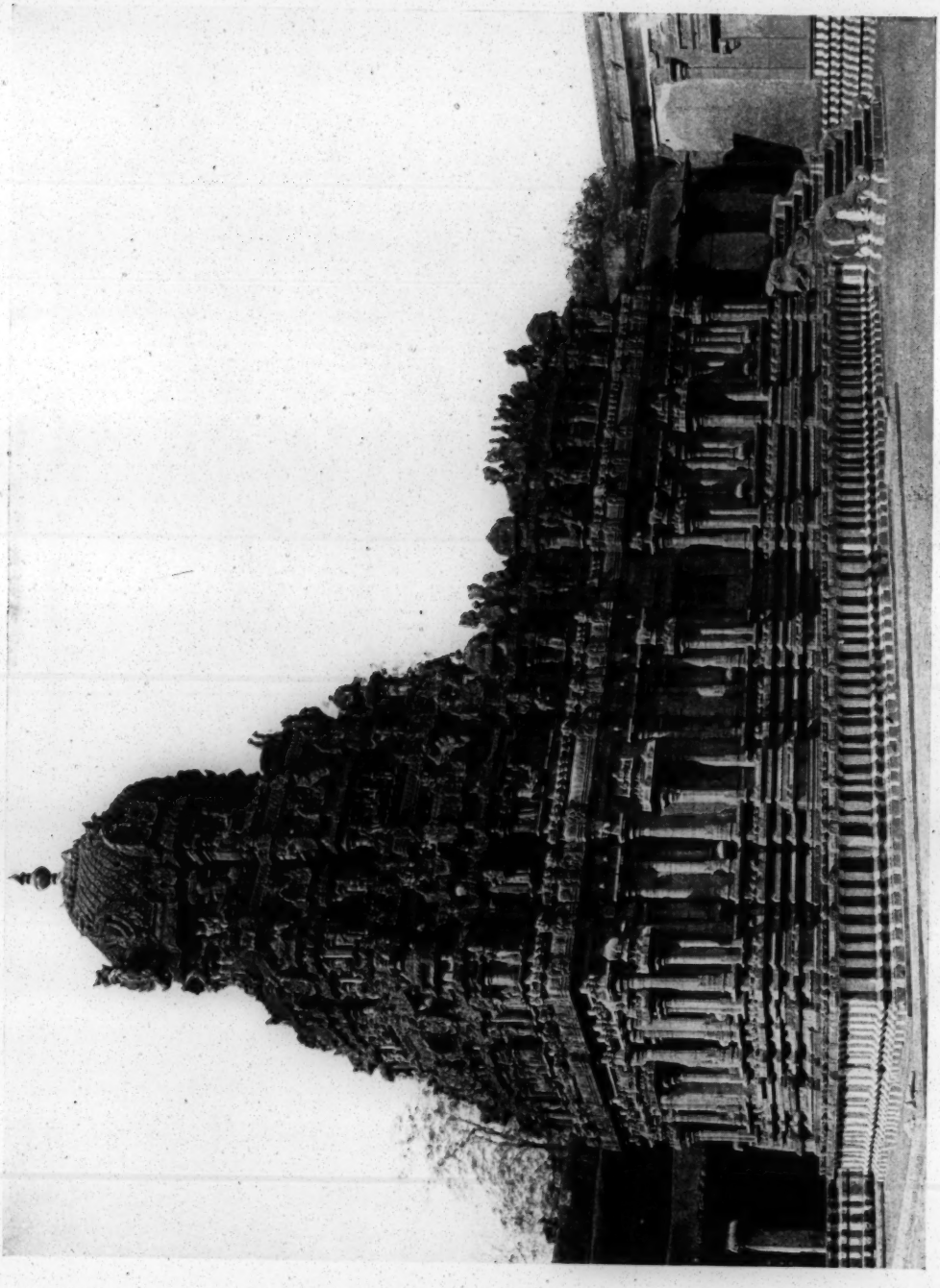
18. The Mosque at Fatteh pur Sikri is at one end of a vast court which its cloisters surround, and one may make the whole tour of the great quadrangle, passing through long series of arched doorways inlaid with fine mosaic.

19. The Tomb of Tughlak, 4 miles beyond the Kutub Minar at Old Delhi, is also a fort; the domed tomb with its mar-

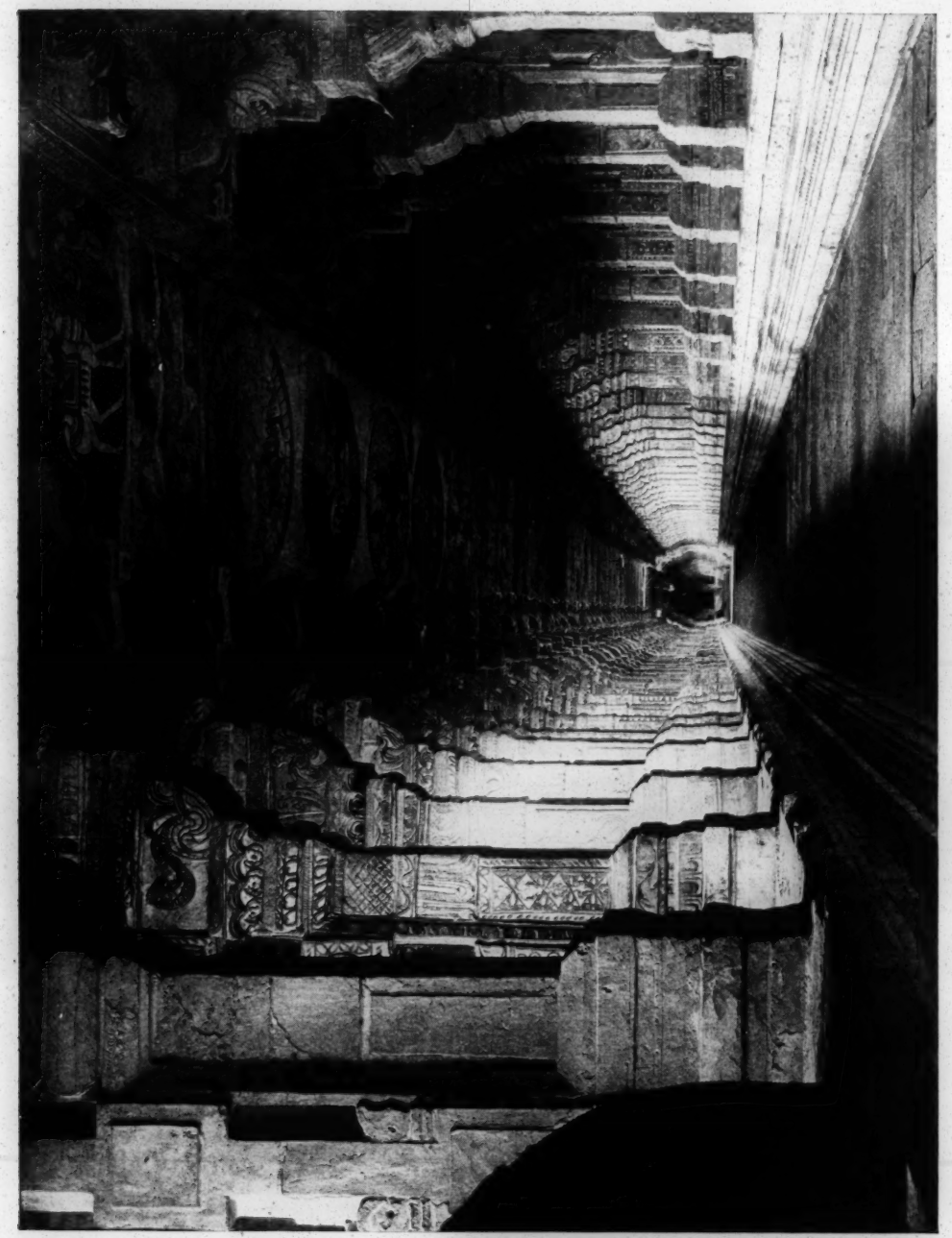
32. ANOTHER MASTERPIECE OF SCULPTURED STONE: HULLABID



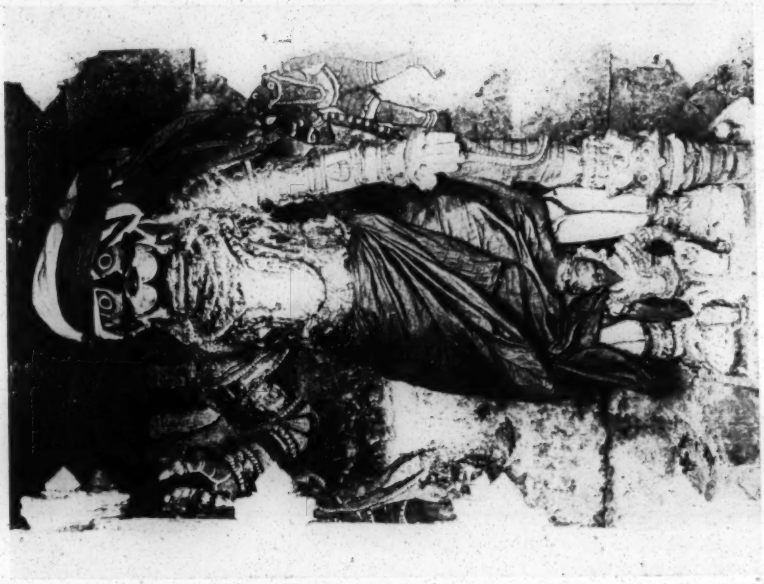
33. A UNIQUE SANSCRIT LIBRARY: TANJORE



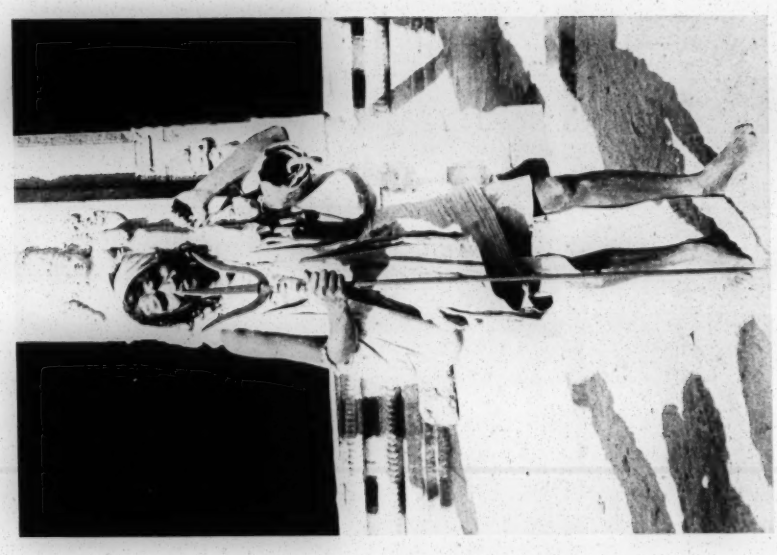
34. A GEM OF DECORATIVE ARCHITECTURE: TANJORE



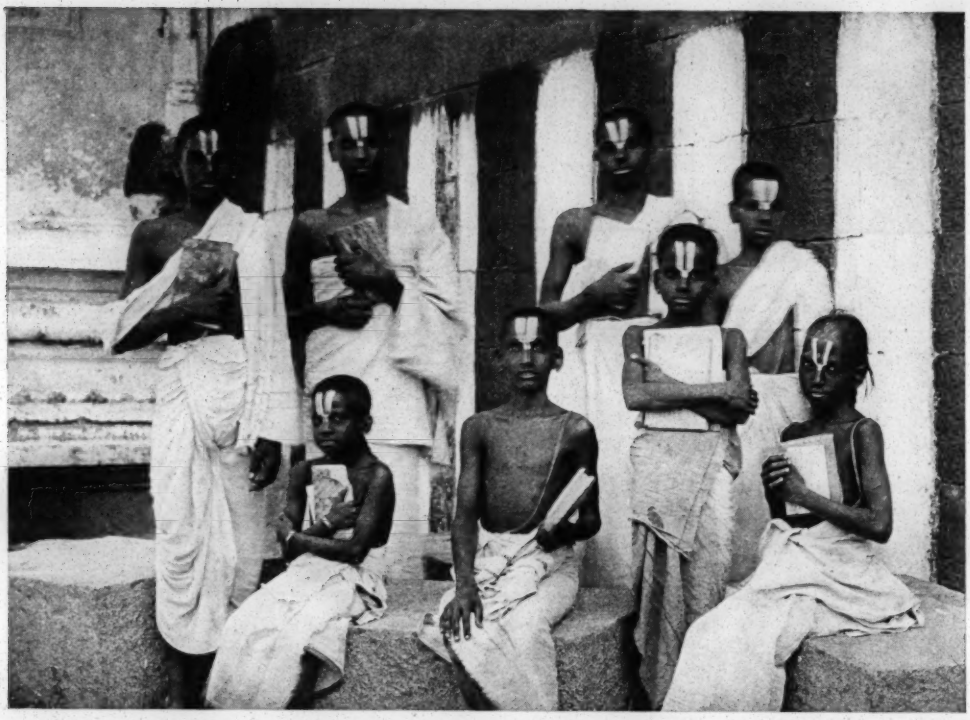
35. CORRIDOR IN THE GREAT TEMPLE AT RAMESWARAM: THE CORRIDOR IS 670 FEET LONG: THE PILLARS ARE MONOLITHS: THE TEMPLE HAS AN ANNUAL INCOME OF $200,000



37. KARUPASAWING OR GOD WORSHIPED BY THE PEOPLE OF THE ROBBER CASTE



36. A WANDERING MENDICANT OF SOUTHERN INDIA



38. STUDENTS OF THEOLOGY: TANJORE

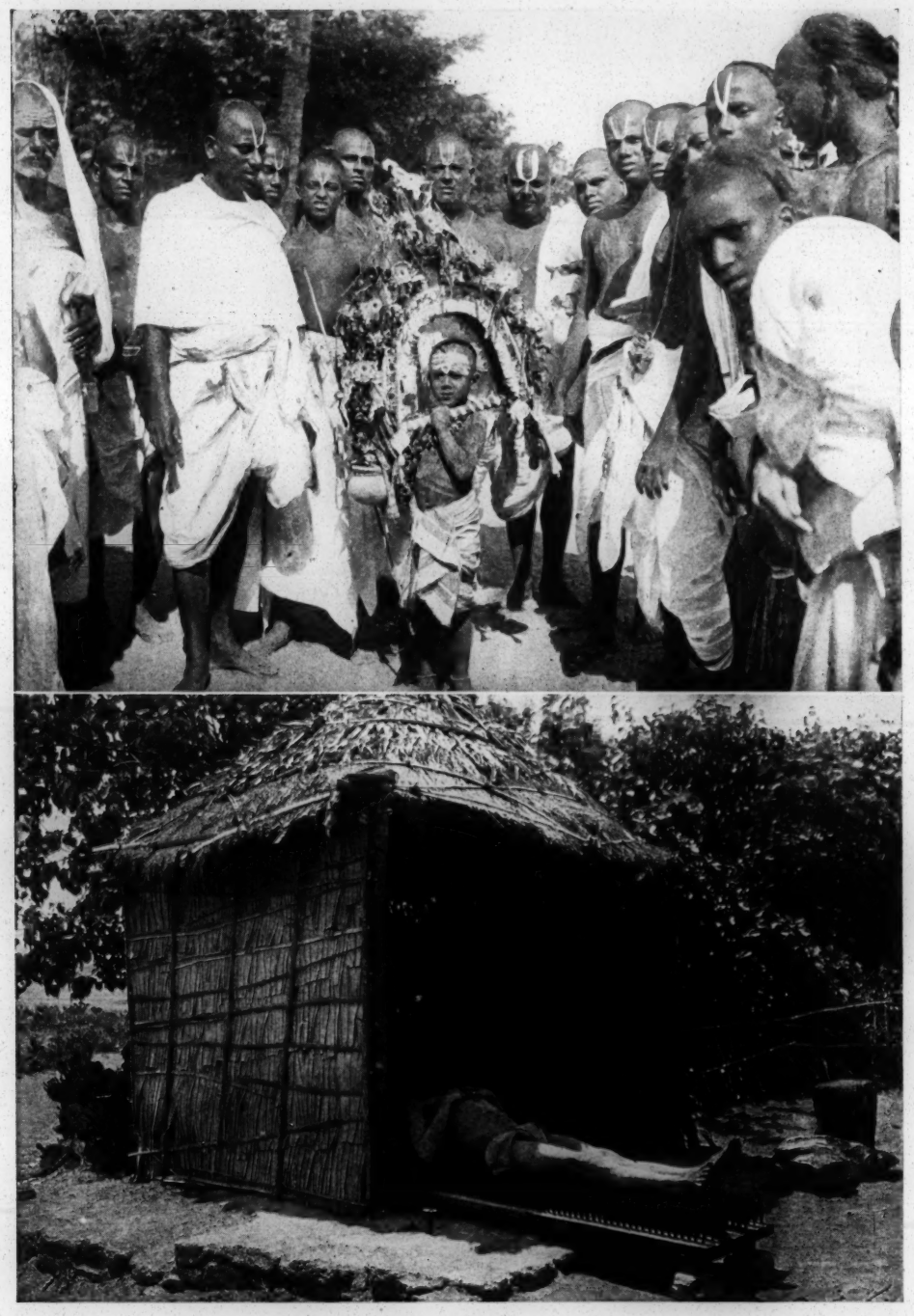
ble traceries being inclosed by a crenelated wall in pentagon shape; its severely simple lines, the inward slope of the walls below the marble dome, and of the encircling outer wall strongly suggesting Egyptian construction. It is a stern, severe mausoleum—an ideal warrior tomb.

20. The Panch Mahal, or five-storied pavilion of the Emperor Akbar in his palace at Fatteh pur Sikri, south of Agra. Each story recedes from the one below, and the top one, a mere kiosk, commands a magnificent view over the country and receives any passing breeze. This pavilion was a summer retreat for the emperor and his ladies. The parapets were formerly solid stone and the spaces between the pillars were filled with openwork stone screens, securing all privacy and shade. No two of the elaborately carved columns on the lower floor are alike.

21. Although the most famous and the best known of all the temples of India, this Temple of Jagannath, at Puri, on the Orissa coast, below Calcutta, is least visited by travelers. Hindu pilgrims visit it, however, and 100,000 are often present at festival times. These visitors heap money and jewels at the shrine, and the temple has an income of more than $150,000 per annum from its endowments and receives as much more in offerings each year. Six thousand priests, keepers, and attendants belong to the temples, and with the hangers-on and the families of all these there is a temple community of 20,000 supported by its funds. Jagannath is a form of Krishua, and his idol here is a rudely carved log which is dragged about in a magnificent car, and pilgrims are often injured in the crash and excitement. Thousands, of course, die of epidemic diseases during festival times. The temple as it now stands is 106 feet high and was built in the last century.

39. FANATIC ROLLING AROUND THE ROCK AT SECUNDERAMALAI

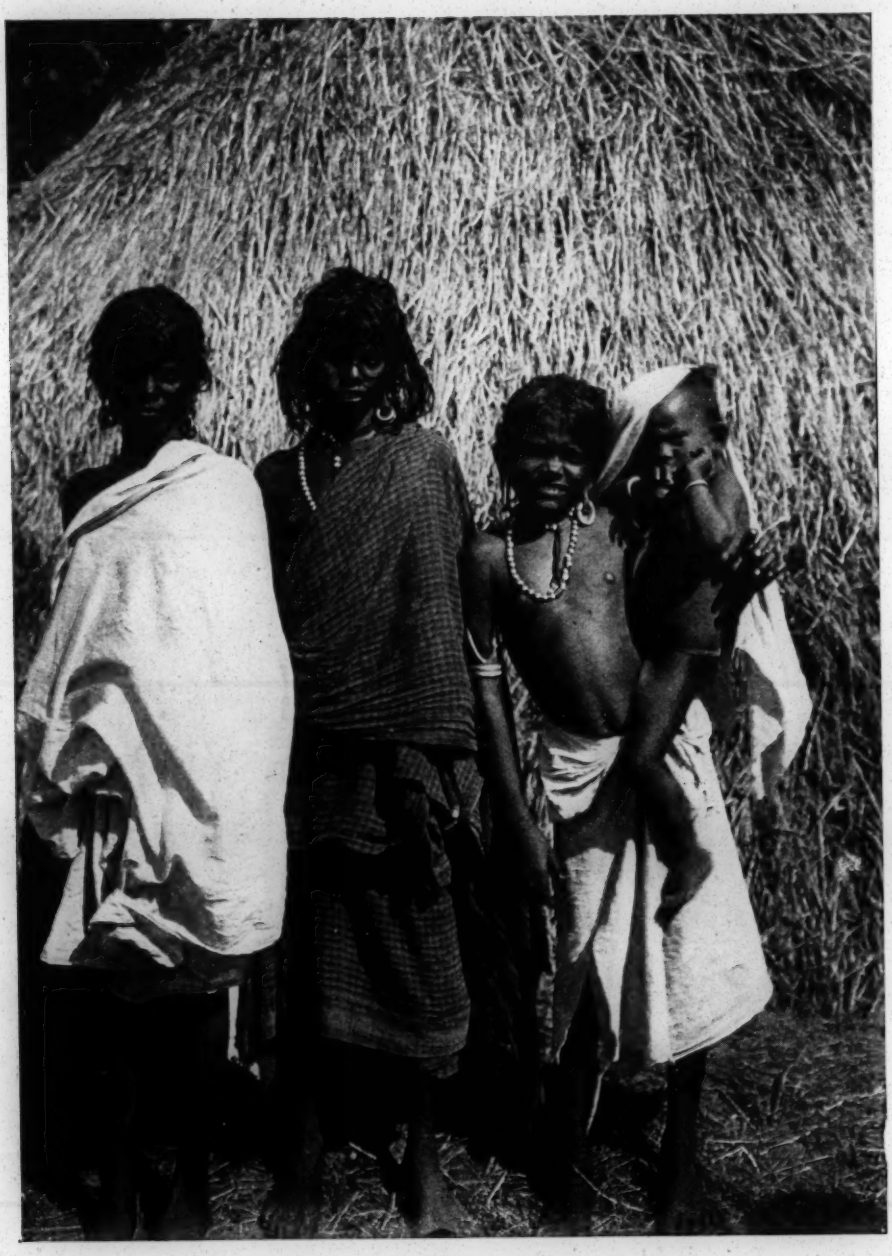
40. EXTORTING ALMS FROM PASSERS BY IN INDIA



41. STUDENTS OF THE VISHNU SECT: SOUTH INDIA

42. A HOLY MAN LYING ON A BED OF SPIKES

43. A ROBBER FAMILY



44. FOUR ROBBER CASTE MAIDENS

45. MARVELOUS STONE CARVING IN FRONT OF SIRI RANGAM, NEAR TRICHINOPLY. ANOTHER VIEW OF THE EXTRAORDINARY CARVING OF THIS TEMPLE IS SEEN IN NUMBER 46

22. This Great Temple at Bhuvaneshwar is called by Fergusson "the finest example of a purely Hindu temple in India." It was built in 617-657 A. D. The Great Tower is 55 feet high; every inch of its surface, course after course of stone, is covered with most intricate and elaborate carving.

23. Arch at the entrance of the Great Temple of Bhuvaneshwar, showing another style of architecture.

24. A watchman or Gate Guardian at Temple at Belur.

25. The famous Rock of Trichinoply rises to a height of 265 feet, access to the temples in the rock and on the summit being obtained by staircases and passages tunneled in the rock itself. The rock, like that of Gibraltar, is honeycombed with staircases, galleries, and chambers, with temples and guardrooms, with structures half hewn and half built on its summit. The great battle between the French and English was fought at the base of this rock. Throughout India there are similar rock fortresses.

26. Great Temple of Bhuvaneshwar from another point of view. There were formerly seven thousand temples at this sacred place, but only five hundred now remain surrounding the great lake or tank.

27. The Gol Gumbaz, or Round Dome or Rose Dome Temple at Bijapur, is the mausoleum of Muhammad Adil Shah and is remarkable for its simple grandeur and constructive boldness. It stands on a platform 600 feet square, each side of the building 196 feet. The seven-story tower or minarets at each corner are strangely like Chinese pagodas. The dome is 124 feet in diameter, and the great hall that it covers is 135 feet square—the greatest domed space in the world. There is a marvelous echo heard from the gallery below the dome. Muhammad, his youngest wife, his dancing girl, daughter, and sons lie in tombs in this hall. The small mosque at the edge of the platform is now the travelers' bungalow, where tourists are housed. The Gol Gumbaz was built in 1659.

28. The Palace at Bijapur is a relic house containing hairs of the prophet's beard. The great portico with three arches opens upon a courtyard and tank. The palace once contained a great library, and its marble and ivory-inlaid walls were coated with gold leaf.

29. The Temple of Chenna Kesava at Belur contains some of the most wonderful carvings in stone. It was built in the twelfth century to celebrate the conversion to Vishnuism of a Jain ruler. Fergusson says of this particular porch: "The amount of labor which each particular facet of this porch displays is such as never was bestowed on any surface of equal extent in any building in the world."

30. The Temple (Shrine) at Chidambaram and great gopura in background. The gopuras, or pagodas, at Chidambaram are the oldest in southern India and marvels of sculptured ornament. The temple is enormously rich and contains an unequaled treasury of jewels and silver cars.

31. Holy man with an armful of peacock feathers and his head in an iron cangue that prevents him from lying down or leaning back.

32. The Temple at Hullabid, 10 miles from Belur, is another masterpiece of sculpture and full relief ornament. It is greatly ruined now and many of its gems have been removed to the Museum at Bangalore. When intact it was the finest specimen of Indian art in existence. This column is one "of the most marvelous exhibitions of human labor to be found even in the patient East;" . . . "far surpasses anything in Gothic art. The effects are just what the medieval architects were often aiming at, but which they never attained so perfectly as was done at Hullabid." Fergusson further says, placing this Hullabid Temple and the Parthenon as the two extremes of architecture: "It would be possible to arrange all the buildings of the world between these two extremes, as they tended toward the severe intellectual purity of the one or the playful, exuber-

ant fancy of the other; but perfection, if it existed, would be somewhere near the mean."

33. In the Palace at Tanjore the library is particularly rich in Sanscrit manuscripts, some 18,000 being stored there, and 8,000 of them are like these wood-bound volumes, consisting of strips of talipot palm leaves engraved with a sharp metal stylus. It is the unique Sanscrit library of India, collected there in the sixteenth century.

34. This little Temple of Subramanya in the court of the Great Temple at Tanjore, was built in the sixteenth century and is regarded as the gem of decorative architecture of Dravidian art.

35. The Great Temple of Rameswaram at the extreme southern end of India, facing Adam's Bridge, or the chain of islets that connect it with Ceylon, is fairly one of the wonders of the world. The temple enclosure is 1,000 feet square, the gate 100 feet high, and of carved and painted corridors, like this one, which is 670 feet in length, there are altogether in the temple, corridors that make a total of 4,000 feet of such impressive splendor. The temple was founded by Rama in the age of fable; it has an endowed income of quite $200,000 per annum, and is the goal of pilgrims from every part of India.

36. A Samayasi or itinerant monk—one of the holy men who roam India, begging their way, and who are never sent to the workhouse.

37. The robbers never go out on a stealing expedition without first getting consent of their god.

38. Brahman boys studying to be priests in the Temple at Tanjore. The marks on their foreheads are sacred ashes, and indicate that they are worshipers of Vishnu.

39. Penitents and fakirs may be seen fulfilling the most absurd vows at all the sacred places of India. This fanatic is rolling over and over on the road that makes the circuit of the rock at Secunderamalai, a distance of 3 miles.

40. The parents of this child are not doing penance for their own sins by placing this crushing rock on the body, but are merely trying to move the sympathetic to give alms.

41. Boy with Kavadi or festival decoration carried over his head. The Brahmans surrounding him have the mark of Vishnu painted on their foreheads.

42. A fakir or Hindu Samayasi lying on a bed of pointed nails.

43 and 44. The rigid caste system of India, with its four great divisions which have been for many centuries rigidly defined, has always excited the wonder of the white man.

The Brahmans are said to have sprung from the head of the creator Brahma. Being thus born from his noblest part, they are, by birth, preëminent in dignity and holiness. They are the priests and law-givers of the nation.

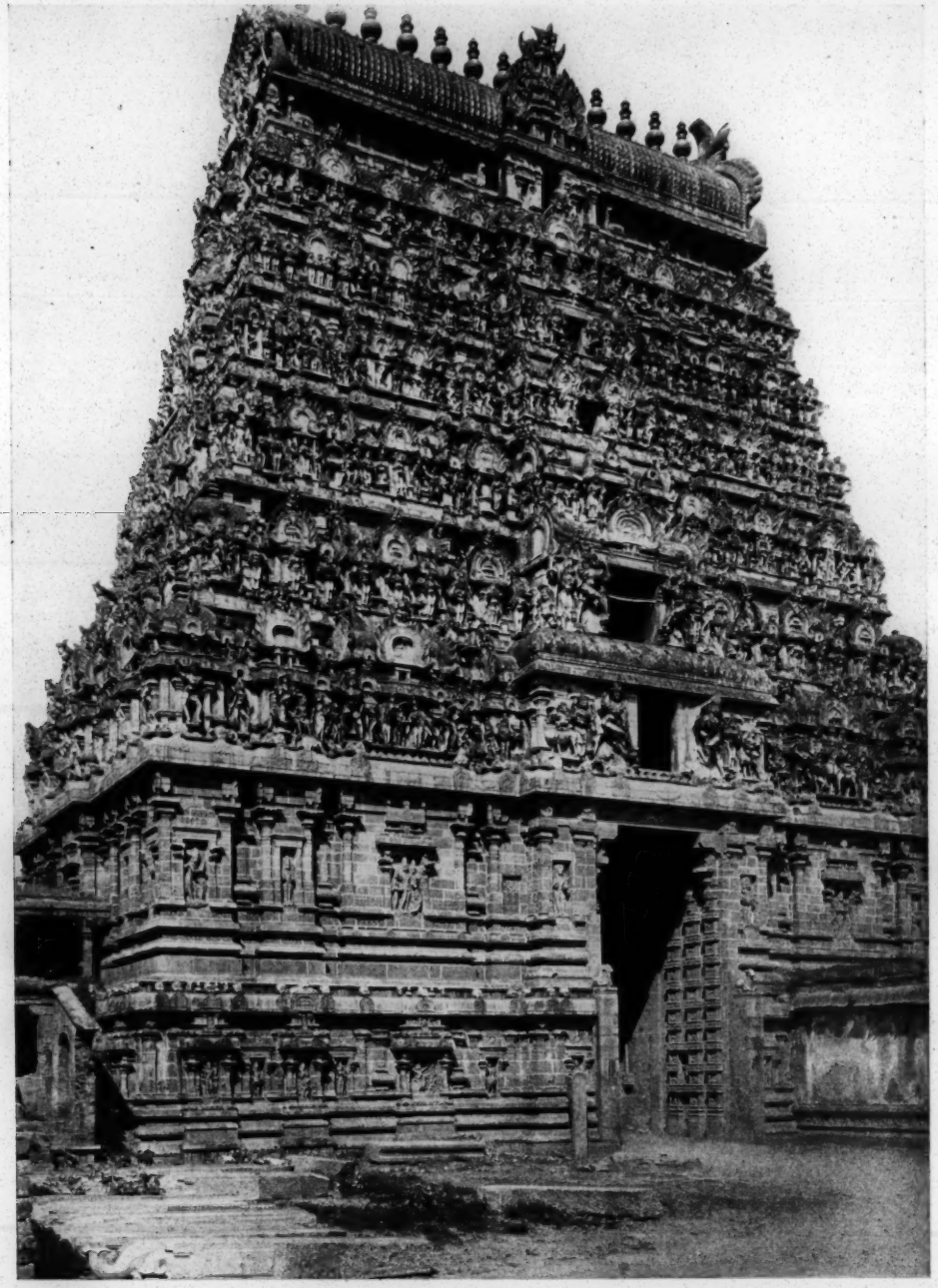
The Kschatryas, or warriors, sprang from the shoulders of Brahma, and fill the kingly and military offices.

The Vaisyas, or husbandmen, sprang from the body of the god. It is their duty as merchants and traders to care for the wants of the state.

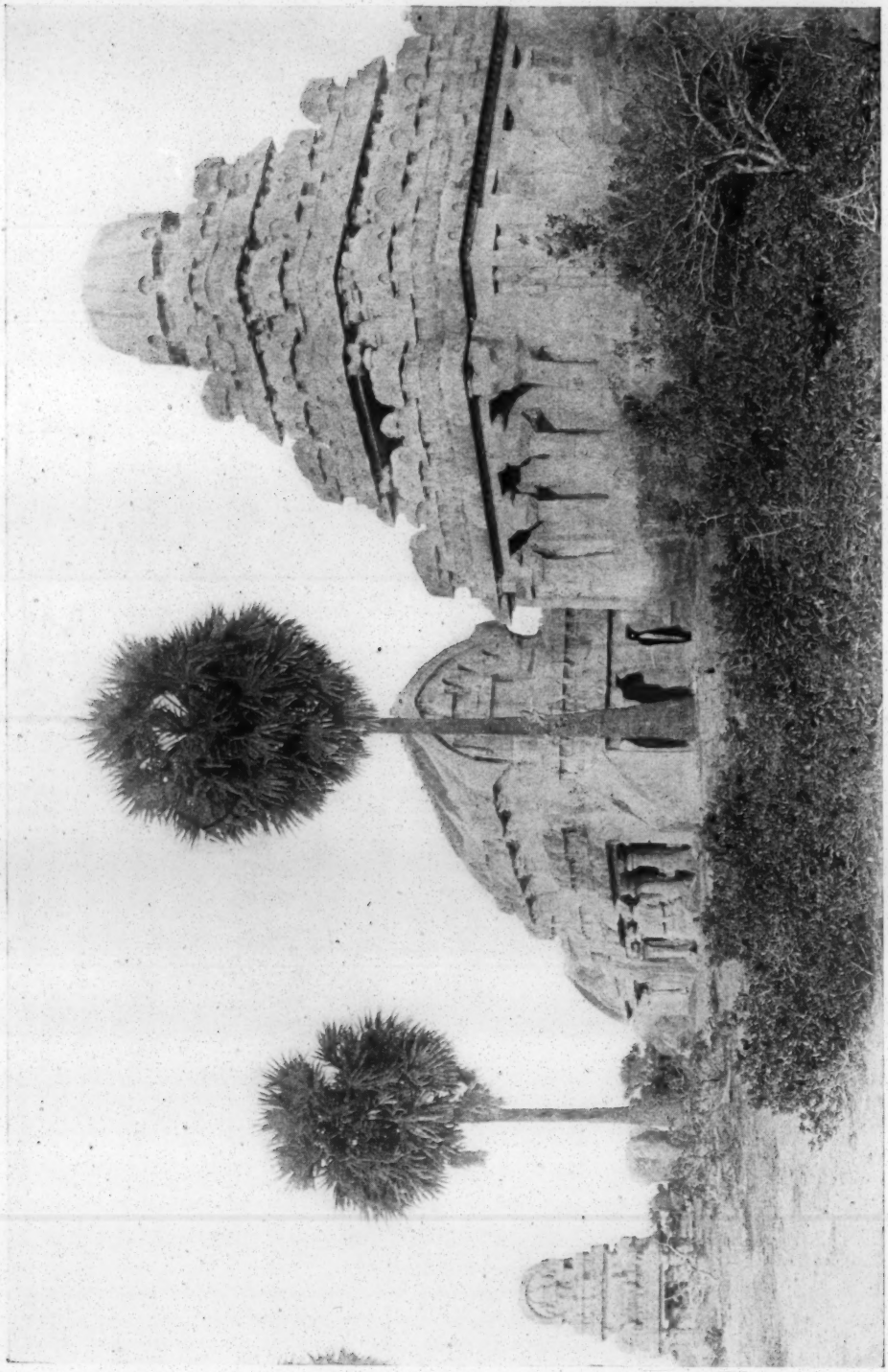
The Sudras, or servants, sprang from his feet. They are therefore subordinate to all, and must, by mechanical and servile labors, contribute to the happiness of the high born, especially to that of the Brahmans.

The military caste and mercantile caste have become almost extinct, leaving the Brahmans and Sudras as the two great divisions. These two have again been subdivided into many tribes and castes, so that it is commonly said that there are eighteen chief and one hundred and eight minor castes.

"The number of castes will not excite wonder, when it is remembered that almost every employment or profession forms a separate caste. The members of these subdivisions, though belonging to the same great caste, will not intermarry, nor will they eat, drink, or associate with each other. Thus, physicians form a separate caste, the druggists another, the shepherds another, and so on with herdsmen, barbers, writers, farmers, carpenters, goldsmiths, masons, blacksmiths,



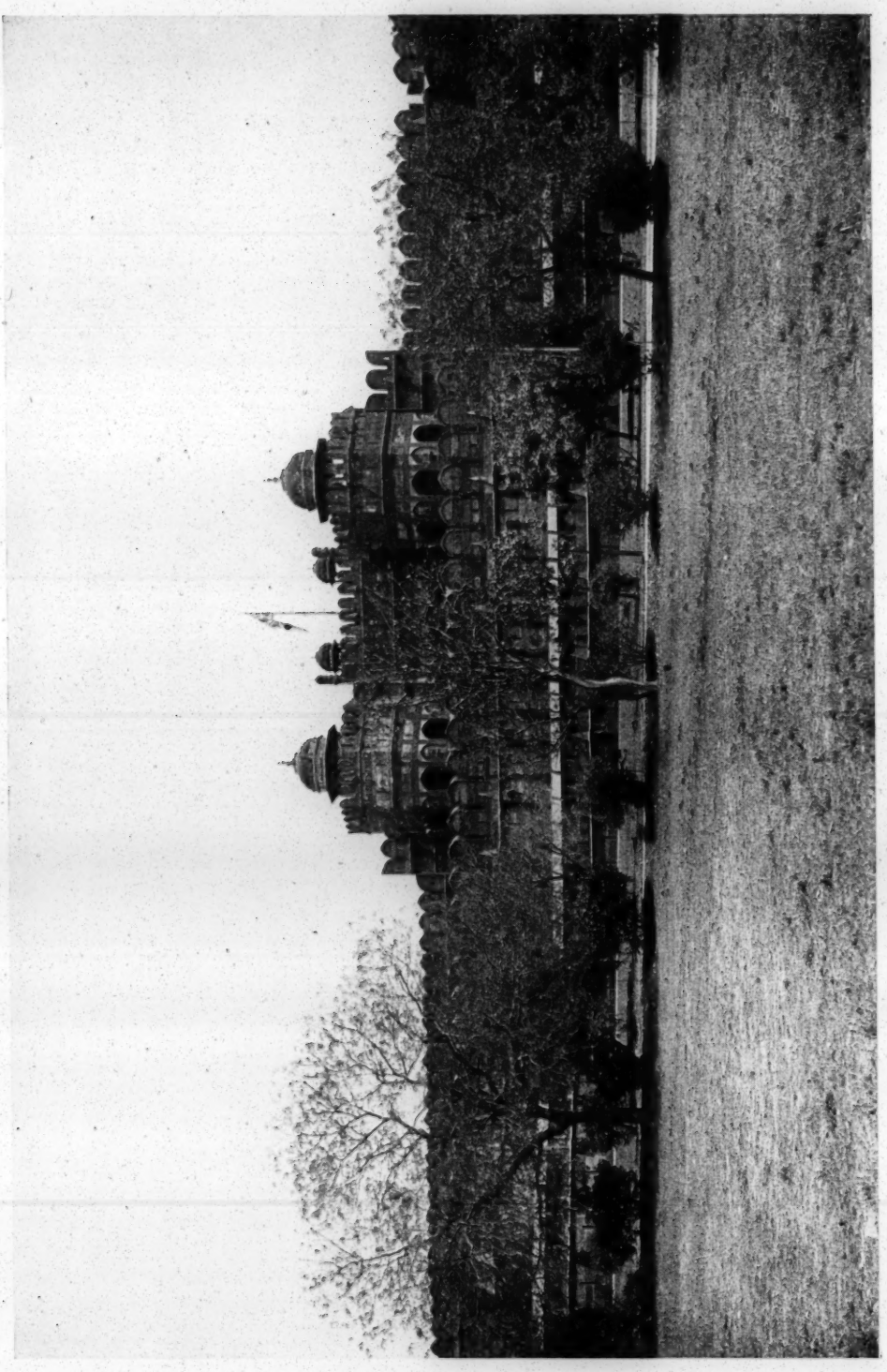
46. THE GREAT TOWER OVER THE ENTRANCE TO THE HINDU TEMPLE AT SIRI RANGAM



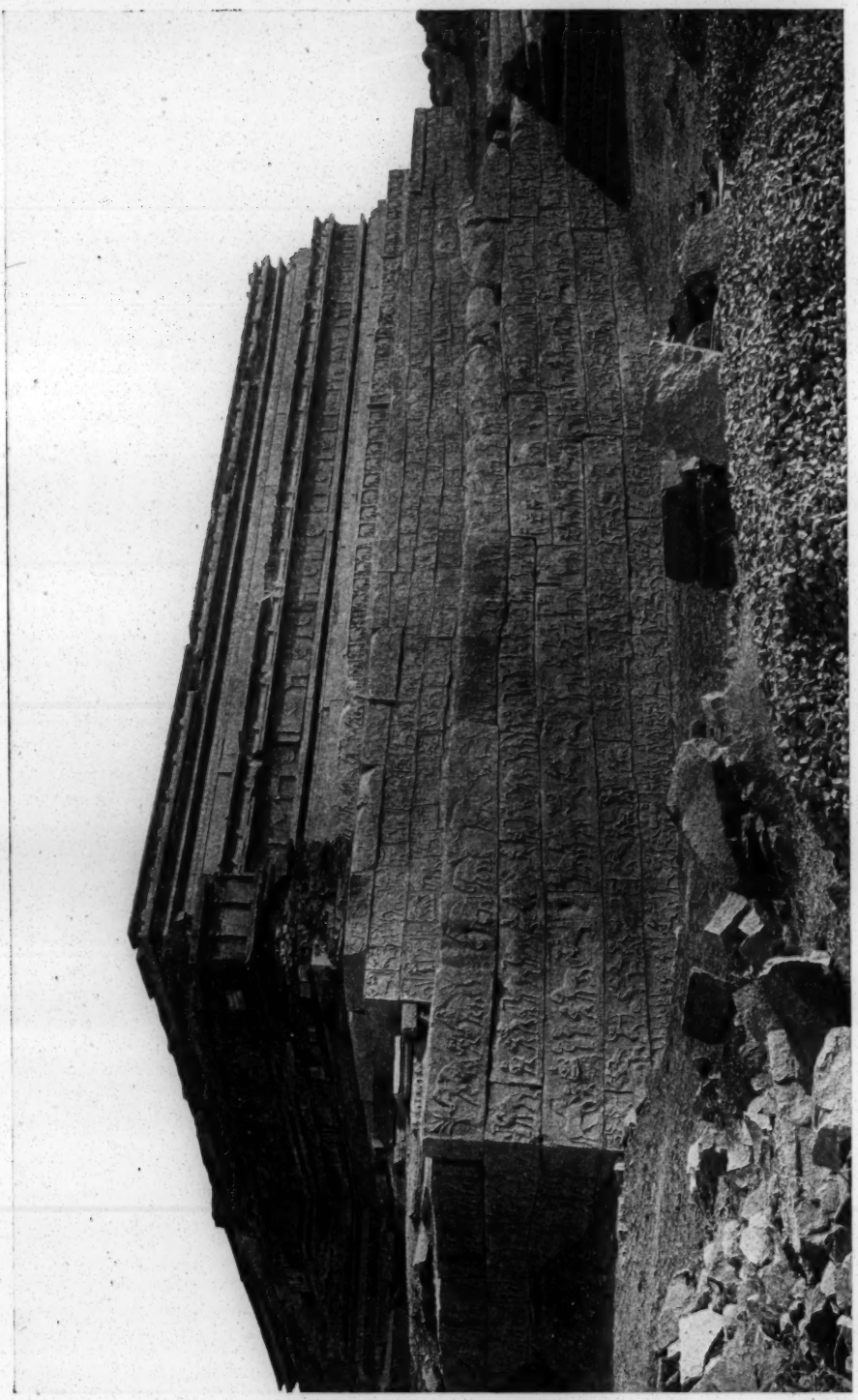
47. THE ROCK-CUT TEMPLES OF MAHALIPURA, NEAR MADRAS

48. THE KAILAS OR ROCK-CUT TEMPLE AT ELORA

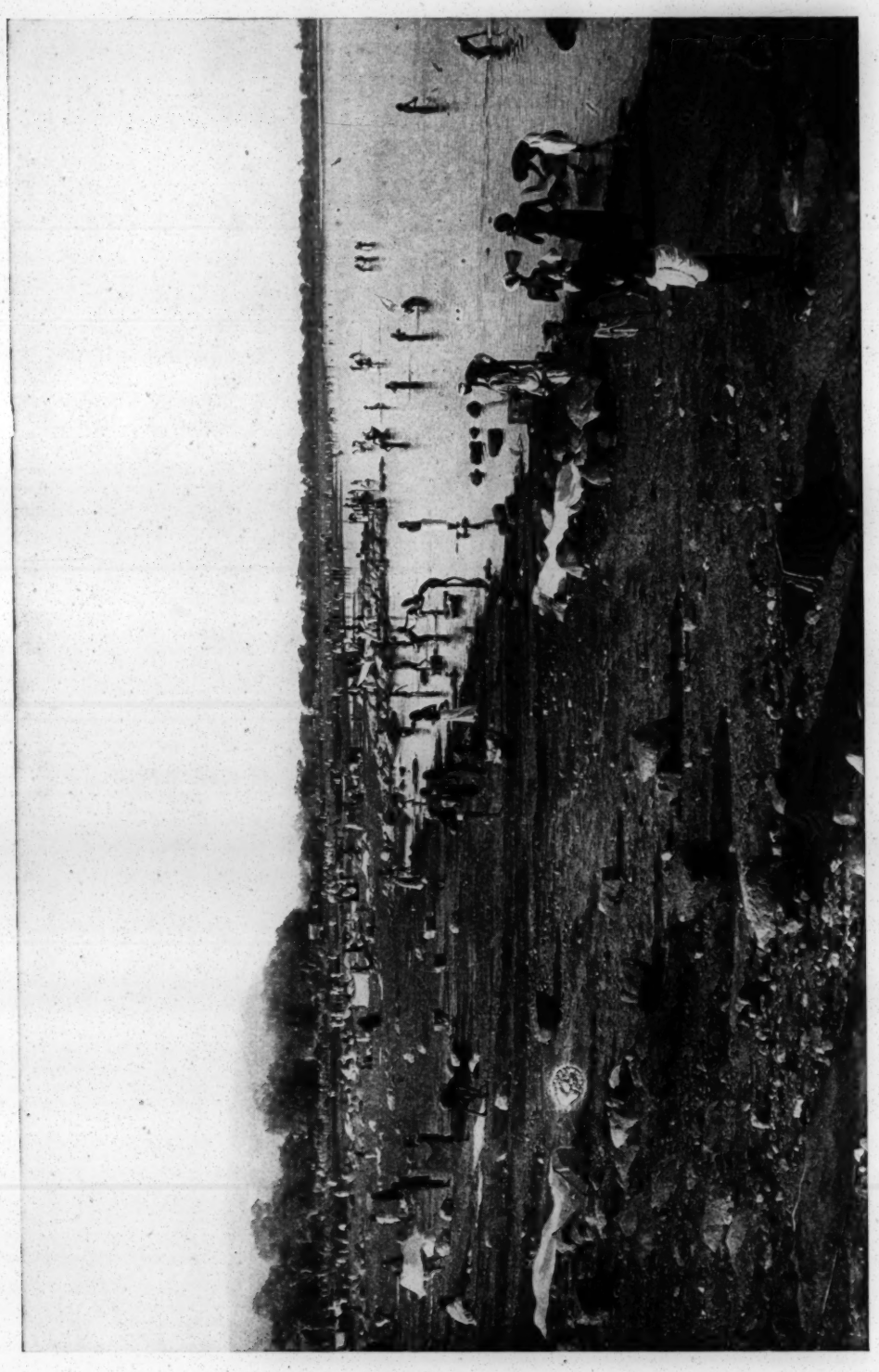
This temple is cut from the face of the rock, the interior being cut out and taken away, so that the effect is of a temple that has been constructed



49. GATEWAY TO THE FORT AT AGRA, BUILT BY AKBAR THE GREAT

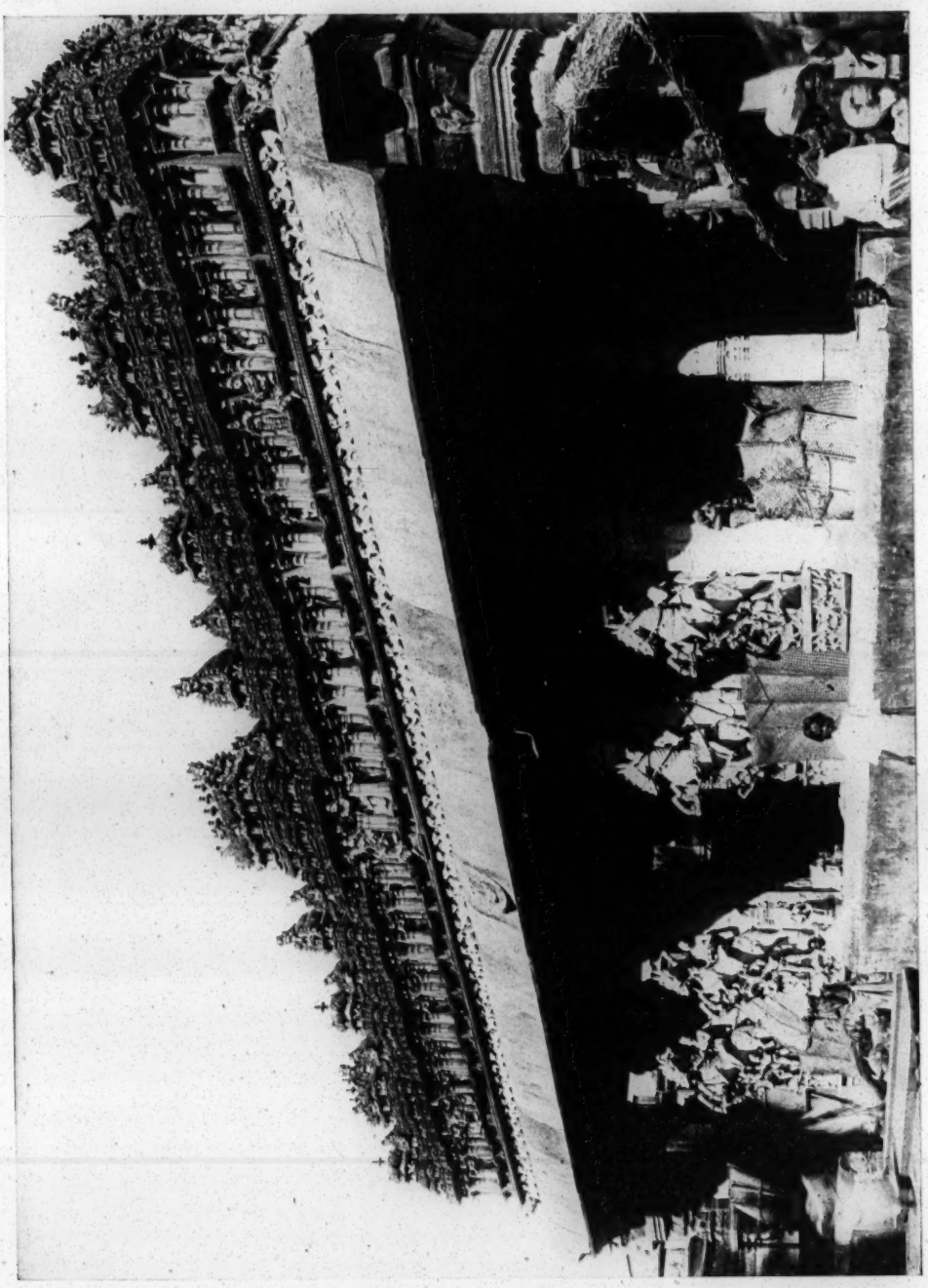


50. OPEN THRONE IN RUINS OF HAMPI



51. MORNING BATH AND TOILET OF THE PIOUS AT SECUNDERAMALAI, NEAR MADURA

52. CROWD OF HINDUS AT A RELIGIOUS FESTIVAL AT SECUNDERAMALAI, NEAR MADURA



53. ENTRANCE TO THE GREAT TEMPLE OF MADURA

and many other trades. The blacksmith will not marry into the family of the weaver, nor will he eat or drink with him, nor will the carpenter with the shepherd, nor the accountant with the mason. Each profession is handed down from father to son. Before his birth the calling of the man is decided and his associations fixed. Society is thus made up, not of men, but of castes, and man sympathizes, not with his fellow-man, but with his caste. No success, no genius, no virtue, can lift him out of the caste in which he was born, and no crime, except a breach of caste, can degrade him from it. This the Hindu believes to be the ordinance and will of God. His place in society was fixed at the creation."

Of recent years the influences of British rule, of Occidental ideas, and particularly of railways, have greatly lessened the stringency of the caste system.

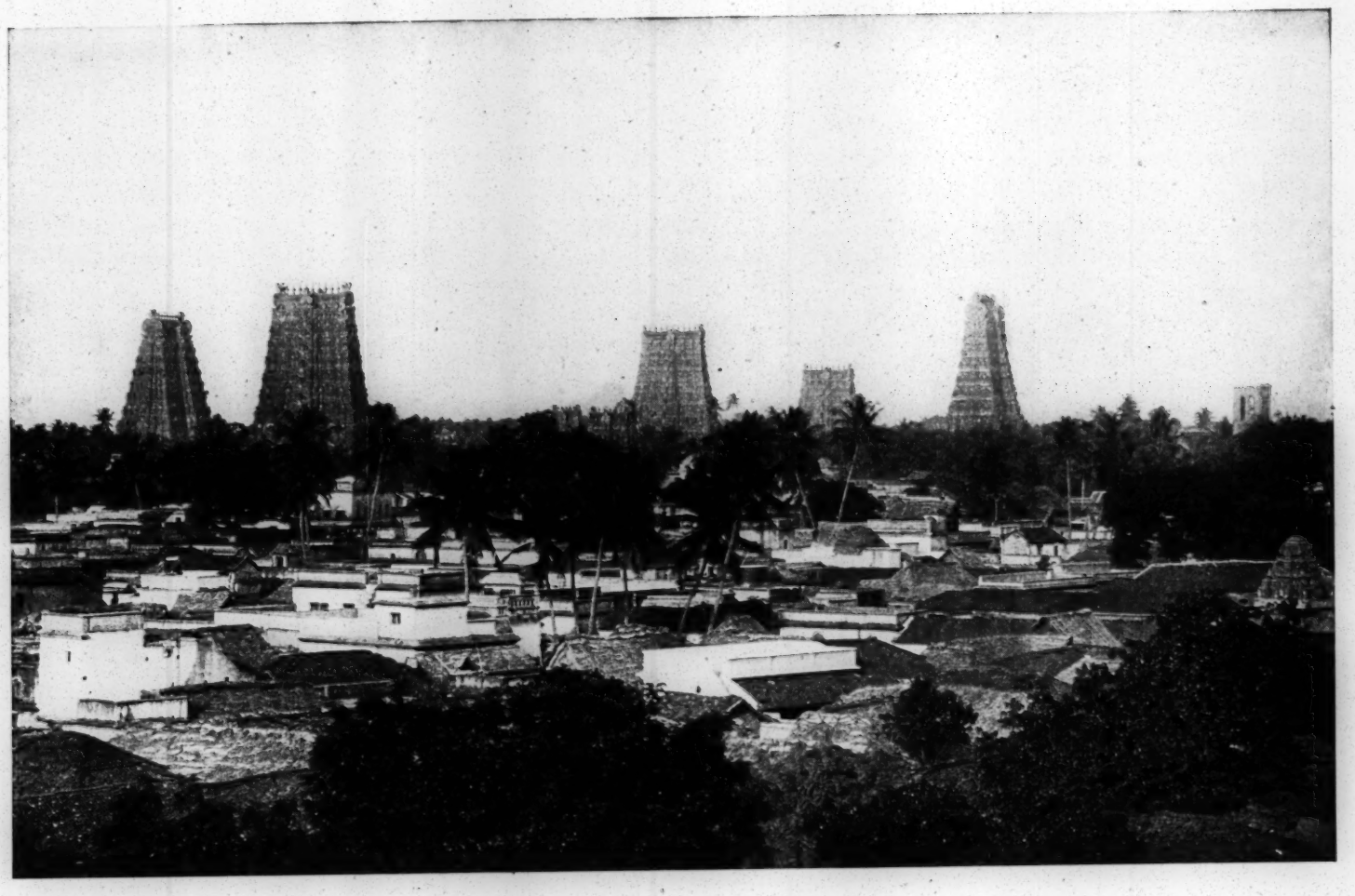
45. The famous Horse Columns in front of the Hall of a Thousand Columns in the third court of the Great Temple of Siri Rangam, 2 miles outside of Trichinoply. Men on rearing horses are shown spearing tigers, the horses' feet resting on the shields of men on foot beside them. The temple possesses a rich treasury of jewels.

46. The Great Gopura or Tower of the Temple at Siri Rangam, 152 feet in height, covered with course after course of gods, warriors, men, and horses carved in everlasting stone.

47. This group of monolithic temples at Mahalipura were cut from boulders as long ago as the fourth and sixth centuries—so early, in fact, that the only architectural models were the wooden churches and monasteries of the Buddhists, which they precisely repeat and preserve as records. Two of the five temples (four only are shown in the picture) are mere image-cells, ponderous sentry-boxes cut from some granite outcropping or stray boulder left in geologic days, each with its archaic stone lion or elephant standing guard beside it. Each stands free and complete, carved from base to finial, the coarse yellow granite showing no seams or crevices save those left by earthquake shock. Of the three larger temples which are grouped together, the Split Temple (the central figure) is forty-two feet long and twenty-five feet high. The exterior was first shaped and carved, and then the interior was hollowed out, leaving such slender lion columns to support the massive entablature and cornices and the solid barrel vault of the second story, that angles and pieces of the cornice fell away and the solid walls gaped in cracks that show the sky. If an earthquake caused these cracks, it was enough, apparently, to discourage any further work, and all five raths are left incomplete, their interiors still in the rough, the altars and objects of worship never made ready. A few Sanskrit inscriptions give clue to the era of their sculpture, but nothing of record of their real history is known.

The little four-story vihara shown next the Split Temple is twenty-seven feet square and thirty-four feet high. Its exterior is finished, but the work of excavating the interior and the upper rows of cells had apparently only begun when the work stopped, never to be resumed, and only the lizards live and move in these monuments of the great city of Bali.

48. At Ellora, a night's journey from Bombay, there is a series of cave temples, opening from a path or shelf along a cliff front, that extend for a mile and a half in continuous line. All three religions—Buddhist, Brahman, and Jain—had their temples in this wall of trap rock and vied with one another in size and elaboration. The thirty-four complete temples were hollowed out and sculptured during the sixth, seventh, and eighth centuries—all to rouse the same fury of destruction in the Moslem conquerors, who wreaked themselves on the carvings of every single cave, and chamber, and vihara cell, and left not one face unharmed in the thousands of images, figures, and heads. Every nose was struck off by the invaders, and whole heads when they had the time; and now the stain of oil, the litter of flower gar-



54. VIEW OF MADURA FROM THE TOWER OF THE AMERICAN MISSION CHURCH, SHOWING THE GOPURAS OR TOWERS OF THE GREAT TEMPLE OF MEENAKSHI

lands, and the daubs of ocher show that the old religions survive and worshipers are faithful to their traditions and religious festival days.

Two and three-story temples succeed to one's bewilderment, communicating staircases and galleries hewn in the living rock leading from one to another, until one is quite lost. Great halls and chambers, their walls covered with sculpture, every recess holding its image cut from the living rock, are shut from the outer world by rock screens, or galleried walls, whose windows are placed so that the light shall fall on altar, or image, or dagoba, as at Karli, just as the golden statue at Buddha-Gaya was illuminated by the rising sun long before Ellora was known. Bats scream and beat their wings in many dark chambers, which the noisome odor keeps the most industrious visitor away from, and even in the dry, cold weather one has a proper fear of a lurking cobra.

In the so-called Carpenter's Cave, a wooden chaitya hall is exactly imitated in this underground burrowing, even the ribbed ceiling and the heavy joists and beams are imitated in the living rock, as are the dagoba and the seated image of Buddha.

All else at Ellora and elsewhere pales beside the Kailas, the supreme effort of rock-cutters' work, where a court, ninety feet deep and more than one hundred and fifty feet square, was sunk in the solid rock at the edge of the cliff. A rock wall, or screen, was left, as a gateway to the sunken court, and then the detached rock mass, standing free in its midst, was carved over to the outward semblance of an elaborate, two-story, Dravidian temple, and hollowed out into chambers and image halls. The carved columns for flags and lamps remain, the life-sized elephants stand waiting, the sacred bull rests on his pedestal, and all is as complete as anything masons ever constructed. A two-story series of carved chambers surround the court, cave cloisters as elaborately ornamented as the halls of the temple itself. One may walk around the Kailas, view it from different levels from every side, but unfortunately the camera cannot have range enough to reproduce anything but sections. The Ellora caves are cleared of underbrush and rubbish, and well looked after, and railway communication has lately made them easily accessible.

49. Akbar, the greatest Asiatic monarch of modern times, built this fortress about 1580. His empire included the whole of Hindustan north of Deccan. The city of Agra is greatly venerated by the Hindus, as it was the scene of the incarnation of Vishnu under the name of Parasu Rama.

50. The series of figures represent triumphal processions returning from battle.

51. Cleanliness of person and clothing is partially secured by the Hindu custom of bathing and worship at sunrise each morning. The pious ones wade into the stream, as here at Secunderamalai, and after prayers and ablutions drop their winding draperies of white head sheets and wash them. They spread them out on the sand and stones of the river bank and in a few minutes they are dry and may be draped over head and shoulders.

52. It is about 2 miles around the rock, and every one who goes to the festival joins the procession around the rock. The temple at the foot of the rock (not visible) is the Temple of Subrananiam.

53. The Horse Columns of the Pudu Mandapam in the Great Temple of Madura; this great hall was built in 1623-1645, but was never completely finished. Were there not other wonders in India yet greater, these horse columns would be sufficient to make the fame of any temple.

54. The five Great Gopuras of the Madura temple as seen from the tower of the American Mission Church. The space within the enclosure guarded by these enormous gate towers is filled with a labyrinth of shrines, pavilions, courts, cloisters, tanks, and passages. The treasury contains some of the finest pearls and sapphires in all India.

THE HEART OF THE ANTARCTIC

By Lieut. Ernest H. Shackleton

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In the April, 1909, number of the National Geographic Magazine there was printed a summary of the geographical results of Lieutenant Shackleton's South Polar Expedition of 1908–09. The narrative of the extraordinary achievements of his party, which included reaching a point within 110 miles of the South Pole, attaining the South Magnetic Pole, and climbing the lofty summit of the volcano, Mount Erebus, is published this month by J. B. Lippincott Company of Philadelphia, and by courtesy of the publishers the following extracts and illustrations are reprinted here.

Lieutenant Shackleton tells the story of his work simply and modestly in two handsome volumes, beautifully illustrated from photographs and with large maps in colors. An introduction by Hugh Robert Mill summarizes the work of previous south polar expeditions.

MEN go out into the void spaces of the world for various reasons. Some are actuated simply by a love of adventure, some have the keen thirst for scientific knowledge, and others again are drawn away from the trodden paths by the "lure of little voices," the mysterious fascination of the unknown. I think that in my own case it was a combination of these factors that determined me to try my fortune once again in the frozen south.

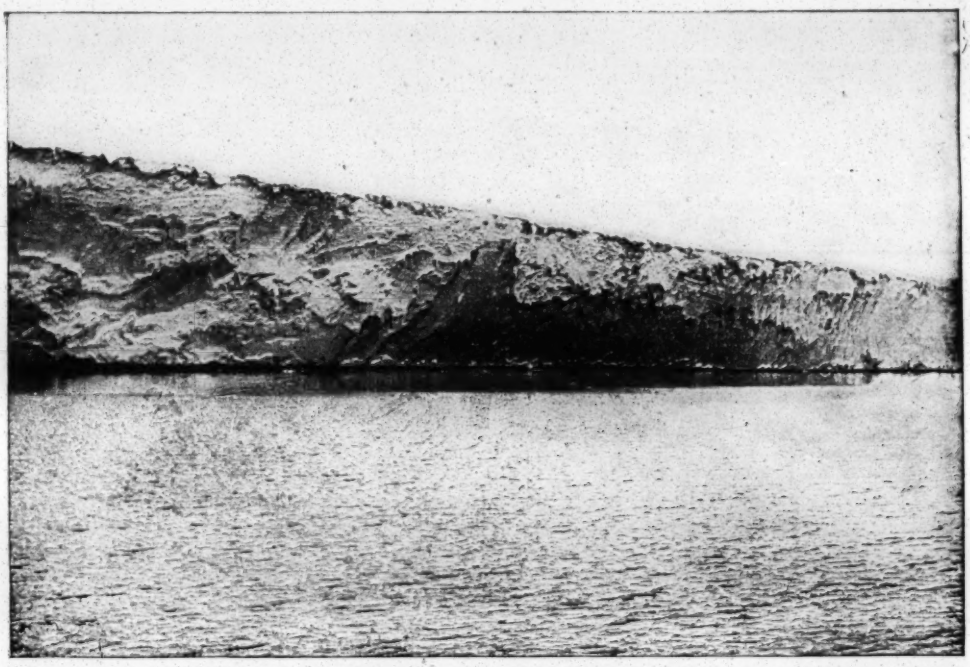
I had been invalided home before the conclusion of the *Discovery* expedition, and I had a very keen desire to see more of the vast continent that lies amid the Antarctic snows and glaciers. Indeed, the stark polar lands grip the hearts of the men who have lived on them in a manner that can hardly be understood by the people who have never got outside the pale of civilization.

The *Discovery* expedition had gained knowledge of the great chain of mountains running in a north and south direction from Cape Adare to latitude 82° 17′ south, but whether this range turned to the southeast or eastward for any considerable distance was not known, and therefore the southern limits of the Great Ice Barrier plain had not been defined.

The glimpses gained of King Edward VII Land from the deck of the *Discovery* had not enabled us to determine either its nature or its extent, and the mystery of the Barrier remained unsolved. It was a matter of importance to the scientific world that information should be gained regarding the movement of the ice-sheet that forms the Barrier. Then I wanted to find out what lay beyond the mountains to the south of latitude 82° 17′ and whether the Antarctic continent rose to a plateau similar to the one found by Captain Scott beyond the Western Mountains.

There was much to be done in the field of meteorology, and this work was of particular importance to Australia and New Zealand, for these countries are affected by weather conditions that have their origin in the Antarctic. Antarctic zoology, though somewhat limited, as regarded the range of species, had very interesting aspects, and I wanted to devote some attention to mineralogy, apart from general geology.

The Aurora Australis, atmospheric electricity, tide movements, hydrography, currents of the air, ice formations and movements, biology and geology, offered an unlimited field for research, and the



VIEW OF THE GREAT ICE BARRIER WHICH EXTENDS FOR 500 MILES ACROSS FROM KING EDWARD VII LAND TO MOUNT EREBUS

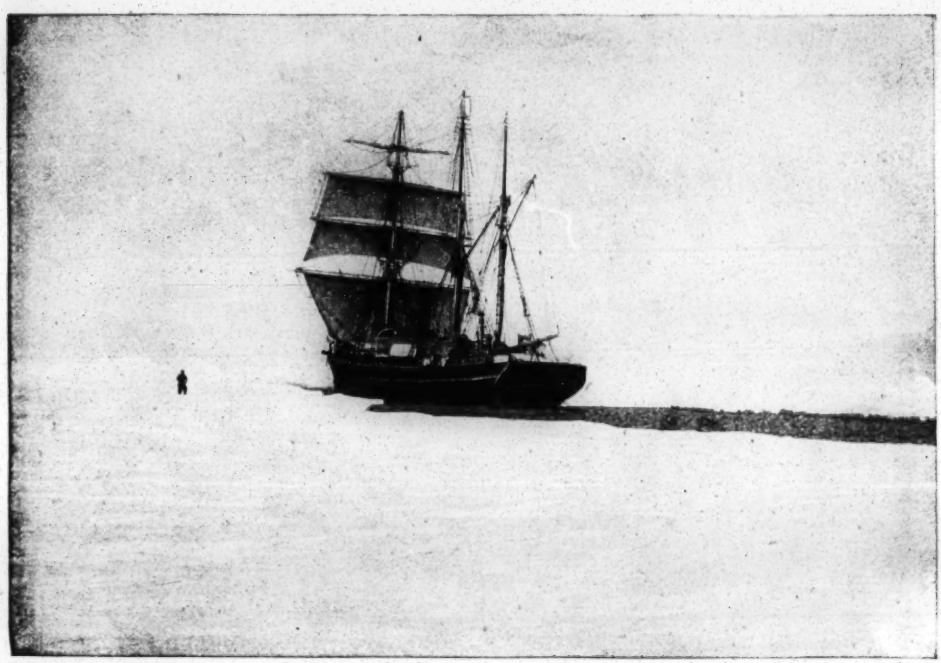
dispatch of an expedition seemed to be justified on scientific grounds quite apart from the desire to obtain a high latitude.

When I found that some promises of support had failed me and had learned that the Royal Geographical Society, though sympathetic in its attitude, could not see its way to assist financially, I approached several gentlemen and suggested that they should guarantee me at the bank, the guarantees to be redeemed by me in 1910, after the return of the expedition. It was on this basis that I secured a sum of £20,000, the greater part of the money necessary for the starting of the expedition, and I cannot express too warmly my appreciation of the faith shown in me and my plans by the men who gave these guarantees, which could be redeemed only by the proceeds of lectures and the sale of my book after the expedition had concluded its work.*

* On his return from "Farthest South," the British government made Lieutenant Shackleton a grant of £20,000 to redeem these pledges.

FOODS TO PREVENT SCURVY

Several very important points have to be kept in view in selecting the food supplies for a polar expedition. In the first place, the food must be wholesome and nourishing in the highest degree possible. At one time that dread disease scurvy used to be regarded as the inevitable result of a prolonged stay in the ice-bound regions, and even the *Discovery* expedition, during its labors in the Antarctic in the years 1902-4, suffered from this complaint, which is often produced by eating preserved food that is not in a perfectly wholesome condition. It is now recognized that scurvy may be avoided if the closest attention is given to the preparation and selection of foodstuffs along scientific lines, and I may say at once that our efforts in this direction were successful, for during the whole course of the expedition we had not one case of sickness attributable directly or indirectly to the foods we had brought with us. Indeed, beyond a few colds, apparently due



THE "NIMROD" PUSHING THROUGH HEAVY PACK ICE ON HER WAY SOUTH, CARRYING THE SHACKLETON PARTY

to germs from a bale of blankets, we experienced no sickness at all at the winter quarters.

In the second place, the food taken for use on the sledging expeditions must be as light as possible, remembering always that extreme concentration renders the food less easy of assimilation, and therefore less healthful. Extracts that may be suitable enough for use in ordinary climates are of little use in the polar regions, because under conditions of very low temperature the heat of the body can be maintained only by use of fatty and farinaceous foods in fairly large quantities. Then the sledging foods must be such as do not require prolonged cooking—that is to say, it must be sufficient to bring them to the boiling point, for the amount of fuel that can be carried is limited. It must be possible to eat the foods without cooking at all, for the fuel may be lost or become exhausted.

Some important articles of food were presented to the expedition by the manufacturers, and others, such as biscuits and pemmican, were specially manufactured to my order. The question of packing presented some difficulties, and I finally decided to use "venesta" cases for the foodstuffs and as much as possible of the equipment. These cases are manufactured from composite boards prepared by uniting three layers of birch or other hard wood with waterproof cement. They are light, weather-proof, and strong, and proved to be eminently suited to our purposes. The cases I ordered measured about two feet six inches by fifteen inches, and we used about 2,500 of them. The saving of weight, as compared with an ordinary packing case, was about four pounds per case, and we had no trouble at all with breakages, in spite of the rough handling given our stores in the process of landing at Cape Royds after the expedition had reached the Antarctic regions.

FUR CLOTHING OF THE BEST

Our furs did not make a very large order, for after the experience of the

THE HUT IN THE EARLY WINTER

The building was made in England and shipped in sections all ready to be put together when the party landed. The hut was lit with acetylene gas

Discovery expedition I decided to use fur only for the feet and hands and for the sleeping bags, relying for all other purposes on woolen garments with an outer covering of wind-proof materials. I ordered three large sleeping bags, to hold three men each, and twelve one-man bags. Each bag had the reindeer fur inside, and was lined with leather and specially strongly sewn.

The one-man bags weighed about ten pounds when dry, but of course the weight increased as they absorbed moisture when in use.

The foot-gear I ordered consisted of eighty pairs of ordinary finnesko, or reindeer fur boots, twelve pairs of special finnesko, and sixty pairs of ski boots of various sizes. The ordinary finnesko is made from the skin of the reindeer stag's head, with the fur outside, and its shape is roughly that of a very large boot without any laces. It is large enough to hold the foot, several pairs of socks, and a supply of sennegrass, and it is a wonderfully comfortable and warm form of foot-gear.

The special finnesko are made from the skin of the reindeer stag's legs, but they are not easily secured, for the reason that the native tribes, not unreasonably, desire to keep the best goods for themselves. I had a man sent to Lapland to barter for finnesko of the best kind, but he only succeeded in getting twelve pairs. The ski boots are made of soft leather, with the upper coming right round under the sole, and a flat piece of leather sewn on top of the upper. They are made specially for use with ski, and are very useful for summer wear. They give the foot plenty of play and do not admit water. The heel is very low, so that the foot can rest firmly on the ski. I bought five prepared reindeer skins for repairing and a supply of repairing gear, such as sinew, needles, and waxed thread.

THE MANCHURIAN PONIES ON QUAIL ISLAND, PORT LYTTELTON, BEFORE THE EXPEDITION LEFT FOR THE ANTARCTIC

Eight ponies were taken to the south polar regions and of these the white ones proved the hardiest

THE FOUR PONIES OUT FOR EXERCISE ON THE SEA ICE

GRASS USED IN THE SHOE TO PREVENT FREEZING

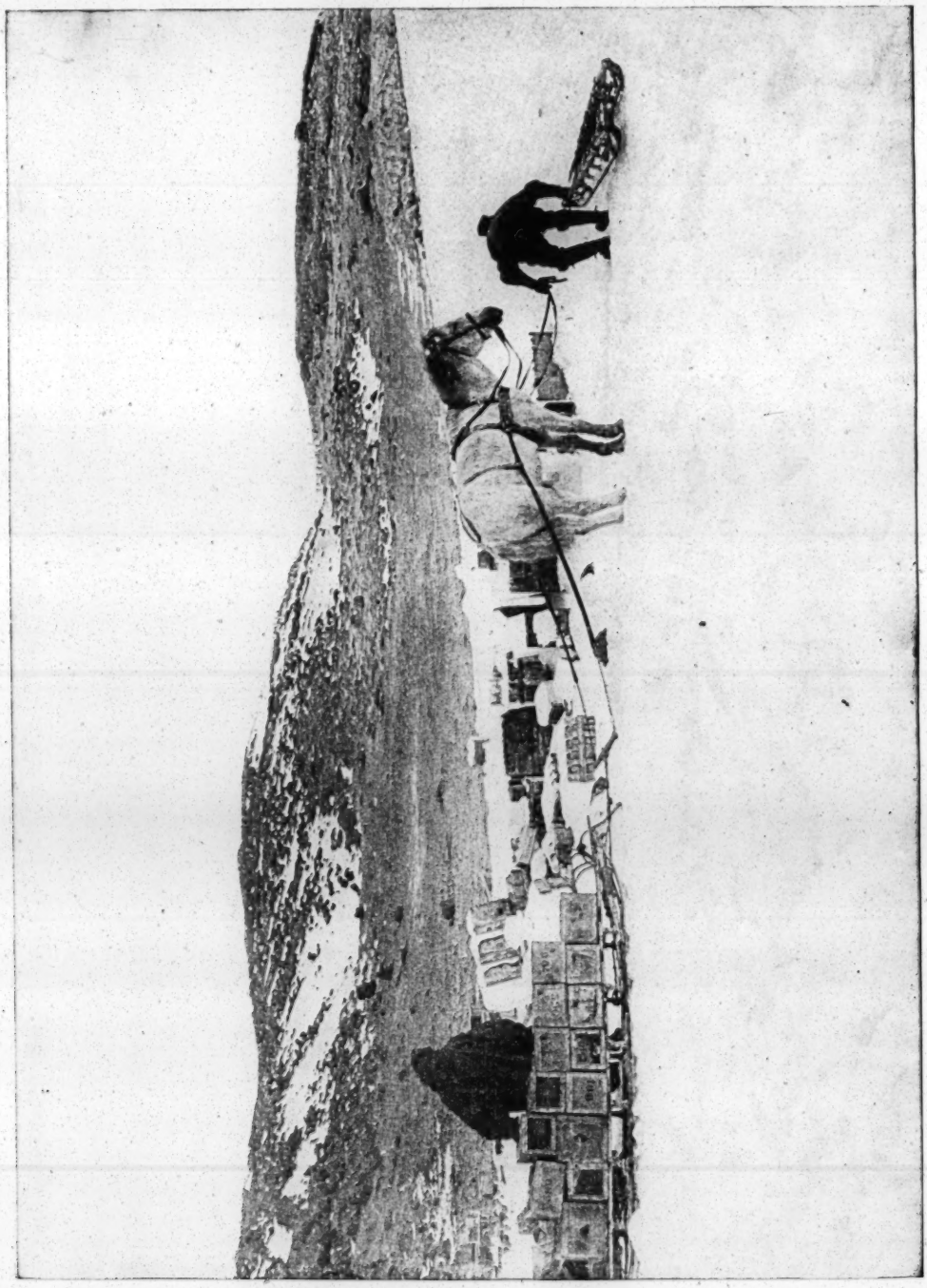
I have mentioned that sennegrass is used in the finnesko. This is dried grass of long fiber, with a special quality of absorbing moisture. I bought fifty kilos (109.37 pounds) in Norway for use on the expedition. The grass is sold in wisps, bound up tightly, and when the finnesko are being put on some of it is teased out and a pad placed along the sole under the foot. Then when the boot has been pulled on more grass is stuffed round the heel. The grass absorbs the moisture that is given off from the skin, and prevents the sock freezing to the sole of the boot, which would then be difficult to remove at night.

The grass is pulled out at night, shaken loose, and allowed to freeze. The moisture that has been collected congeals in the form of frost, and the greater part of it can be shaken away before the grass is replaced on the following morning. The grass is gradually used up on the march, and it is necessary to take a fairly large supply, but it is very light and takes up little room.

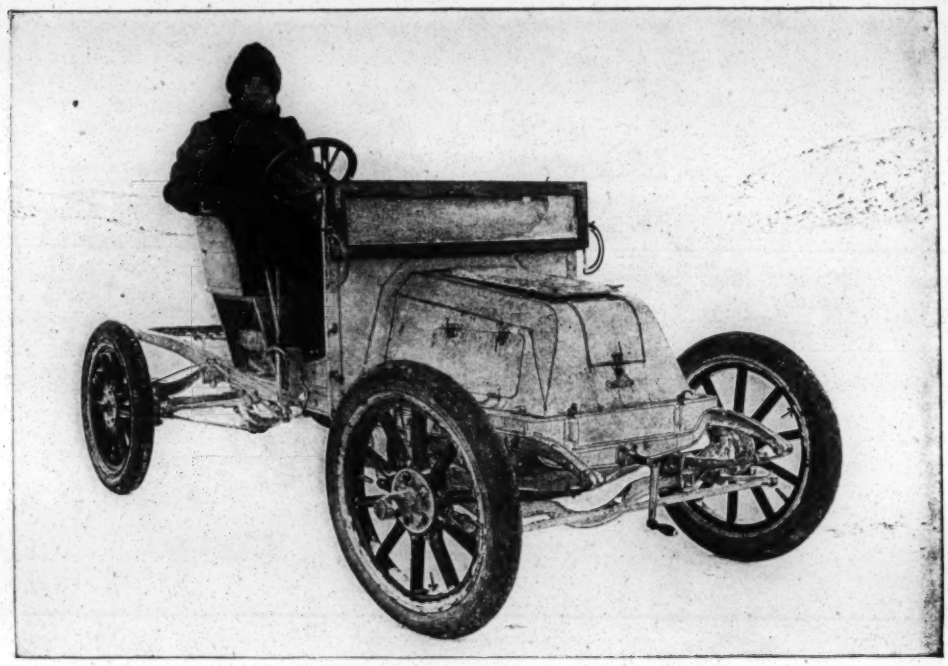
For use on the sledging expeditions I took six "Nansen" cookers made of aluminum, and of the pattern that has been adopted, with slight modifications, ever since Nansen made his famous journey in 1895-96. The sledging tents, of which I bought six, were made of light Willesden rot-proof drill, with a "spout" entrance of Burberry garberdine. They were green in color, as the shade is very restful to the eyes on the white snow plains, and weighed 27 pounds each, complete with five poles and floor cloth.

Each member of the expedition was supplied with two winter suits made of heavy blue pilot cloth, lined with Jaeger fleece. A suit consisted of a double-breasted jacket, vest and trousers, and weighed complete fourteen and three-quarter pounds.

An outer suit of wind-proof material is necessary in the polar regions, and I secured twenty-four suits of Burberry



THE PONY "QUAN" ABOUT TO DRAW A SLEDGE-LOAD OF STORES FROM THE ICE-FOOT TO THE HUT



DAY WITH THE MOTOR-CAR ON THE SEA ICE

garberdine, each suit consisting of a short blouse, trouser overalls, and a helmet cover.

For use in the winter quarters we took four dozen Jaeger camel's-hair blankets and sixteen camel's-hair triple sleeping bags.

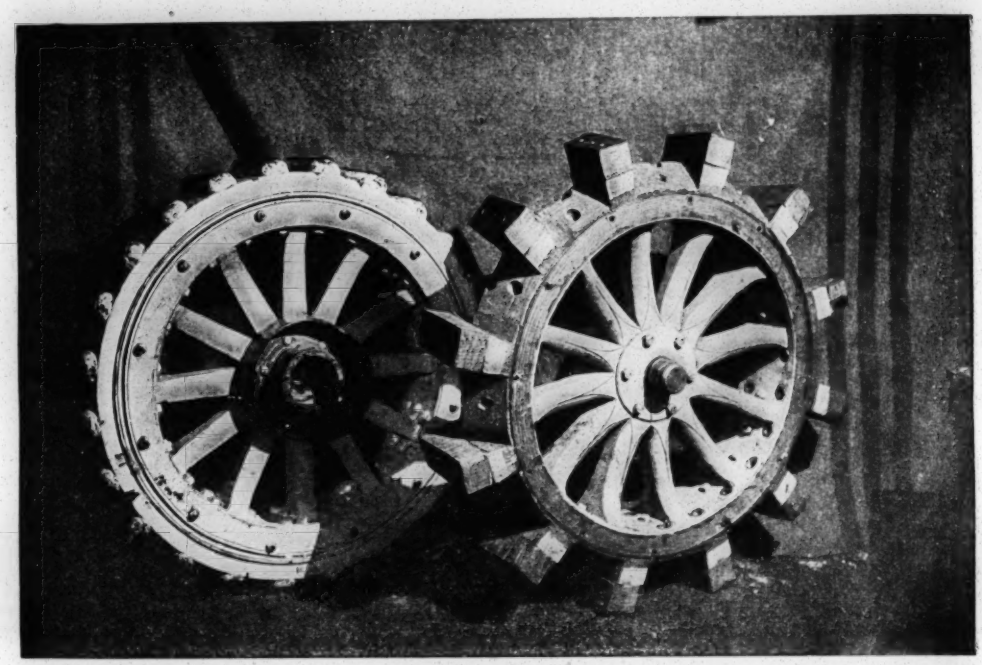
THE MANCHURIAN PONIES

I decided to take ponies, dogs, and a motor-car to assist in hauling our sledges on the long journeys that I had in view, but my hopes were based mainly on the ponies. Dogs had not proved satisfactory on the Barrier surface, and I did not expect my dogs to do as well as they actually did. The use of a motor-car was an experiment which I thought justified by my experience of the character of the Barrier surface, but I knew that it would not do to place much reliance on the machine in view of the uncertainty of the conditions. I felt confident, however, that the hardy ponies used in northern China and Manchuria would be useful if they could be landed on the ice in good condition.

I had seen these ponies in Shanghai, and I had heard of the good work they did on the Jackson-Harmsworth expedition. They are accustomed to hauling heavy loads in a very low temperature, and they are hardy, sure-footed, and plucky. I noticed that they had been used with success for very rough work during the Russo-Japanese war, and a friend who had lived in Siberia gave me some more information regarding their capabilities.

I therefore got into communication with the London manager of the Hongkong and Shanghai bank (Mr. C. S. Addis), and he was able to secure the services of a leading firm of veterinary surgeons in Shanghai. A qualified man went to Tientsin on my behalf, and from a mob of about two thousand of the ponies, brought down for sale from the northern regions, he selected fifteen of the little animals for my expedition.

The ponies chosen were all over twelve years and under seventeen years in age, and had spent the early part of their lives in the interior of Manchuria. They were



SPECIAL MOTOR WHEELS: THE ORIGINAL FORM ON THE LEFT, AN ANTARCTIC FORM ON RIGHT

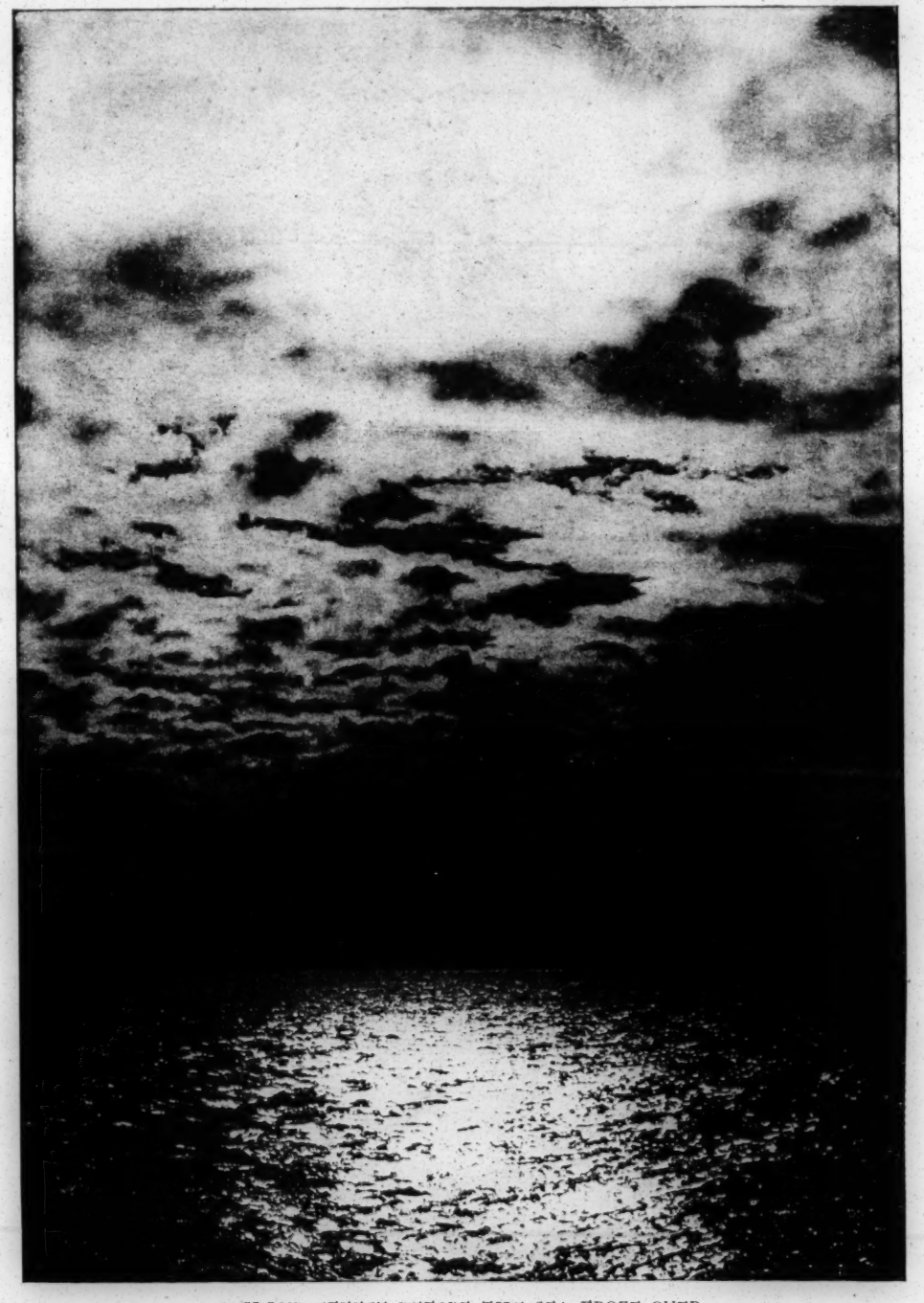
Ordinary wheels with rubber tires were found to be the most satisfactory

practically unbroken, were about fourteen hands high, and were of various colors. They were all splendidly strong and healthy, full of tricks and wickedness, and ready for any amount of hard work over the snow-fields.

The fifteen ponies were taken to the coast and shipped by direct steamer to Australia. They came through the test of tropical temperatures unscathed, and at the end of October, 1907, arrived in Sydney, where they were met by Mr Reid and at once transferred to a New Zealand bound steamer. The Colonial governments kindly consented to suspend the quarantine restrictions, which would have entailed exposure to summer heat for many weeks, and thirty-five days after leaving China the ponies were landed on Quail Island, in Port Lyttelton, and were free to scamper about and feed in idle luxury.

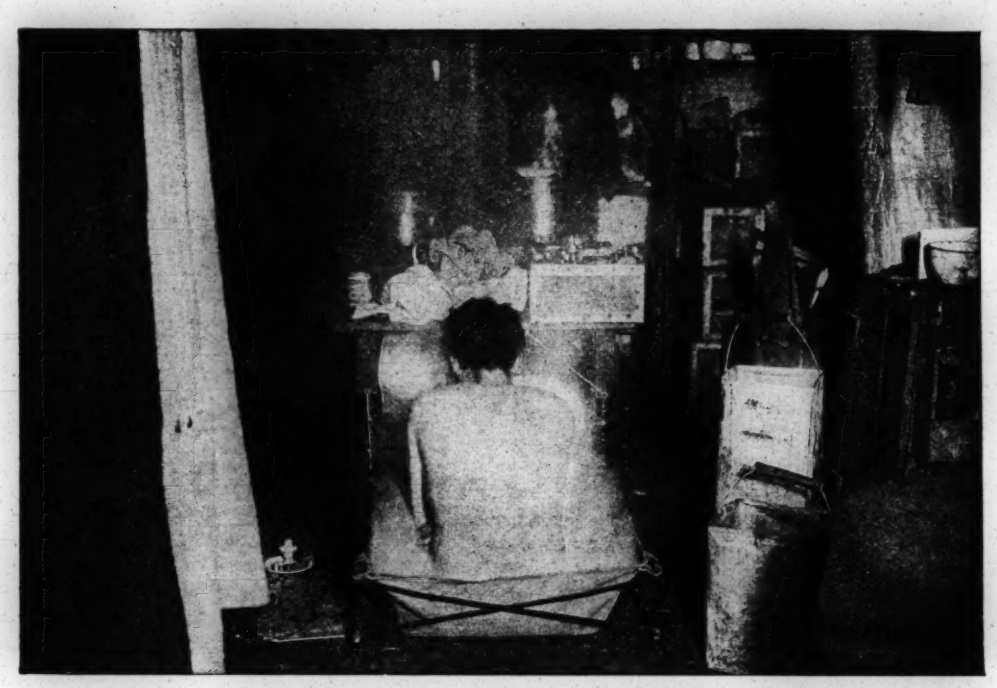
I had secured in London twenty tons of maize and ten hundredweight of compressed Maujee ration for the feeding of the ponies in the Antarctic. The maize was packed in about seven hundred tin-lined air-tight cases, and the ration was in one-pound air-tight tins. This ration consists of dried beef, carrots, milk, currants and sugar, and it provides a large amount of nourishment with comparatively little weight. One pound of the ration will absorb four pounds of water, and the ponies were very fond of it. We also secured in Australia ten tons of compressed fodder, consisting of oats, bran, and chaff. This fodder was packed in two hundred and fifty small bales.

I placed little reliance on the dogs, as I have already stated, but I thought it advisable to take some of these animals. I knew that a breeder in Stewart Island, New Zealand, had dogs descended from the Siberian dogs used on the Newnes-Borchgrevinck expedition, and I cabled to him to supply as many as he could up to forty. He was only able to let me have nine, but this team proved quite sufficient for the purposes of the expedi-



A CLOUD EFFECT BEFORE THE SEA FROZE OVER

MUSIC IN THE HUT DURING THE WINTER



A MEMBER OF THE EXPEDITION TAKING HIS BATH

tion, as the arrival of pups brought the number up to twenty-two during the course of the work in the south.

THE SOUTH POLAR PARTY

Our party on leaving England consisted of:

E. H. Shackleton, commander.

Lieut. J. B. Adams, R. N. R., meteorologist.

Sir Philip Brocklehurst, Bart., assistant geologist and in charge of current observations.

Bernard Day, electrician and motor expert.

Ernest Joyce, in charge of general stores, dogs, sledges, and zoological collections.

Dr. A. F. Mackay, surgeon.

Dr. Eric Marshall, surgeon, cartographer.

G. E. Marston, artist.

James Murray, biologist.

Raymond Priestley, geologist.

William Roberts, cook.

Frank Wild, in charge of provisions.

Besides myself, Wild and Joyce only had had previous polar work, having been members of the *Discovery* expedition.

After the expedition had reached New Zealand and the generous assistance of the Australian and New Zealand governments had relieved me from some financial anxiety, I was able to add to the staff Douglas Mawson, lecturer of mineralogy and petrology at the Adelaide University, as physicist, and Bertram Armytage as a member of the expedition for general work; Prof. Edgeworth David, F. R. S., of Sydney University, as geologist and scientist; Leo Collon, a young Australian, and George Buckley, of New Zealand.

Our party found the hut which the *Discovery* party had abandoned at Cape Royds four years previously practically clear of snow, and the structure quite intact.

There was a small amount of ice inside on the walls, evidently the result of a summer thaw, but even after five years' desertion the building was in excellent

preservation. A few relics of the last expedition were lying about, including bags containing remnants of provisions from various sledging parties. Among these provisions was an open tin of tea, and the following morning the party made an excellent brew from the contents. It speaks volumes for the dryness of the climate that the tea should retain its flavor after exposure to the air for five years.

A sledging tin of petroleum was also used and was found to be in perfect condition. The ice on the end of Hut Point was cracked and crevassed, but in all other respects things seemed to be the same as when the *Discovery* steamed away to the north in February, 1904. The cross put up in memory of Vince, who lost his life close by in a blizzard, was still standing, and so were the magnetic huts.

EXPERIENCES WITH THE PENGUINS

One day we were pulling along at a good rate, landing stores, when suddenly a heavy body shot out of the water, struck the seaman who was pulling stroke, and dropped with a thud into the bottom of the boat. The arrival was an Adelie penguin. It was hard to say who was the most astonished—the penguin, at the result of its leap on to what it had doubtless thought was a rock, or we, who so suddenly took on board this curious passenger. The sailors in the boat looked upon this incident as an omen of good luck. There is a tradition among seamen that the souls of old sailors, after death, occupy the bodies of penguins, as well as of albatrosses; this idea, however, does not prevent the mariners from making a hearty meal off the breasts of the penguins when opportunity offers.

The penguins were round us in large numbers. We had not had any time to make observations of them, being so busily employed discharging the ship, but just at this particular time our attention was called to a couple of these birds which suddenly made a spring from the water and landed on their feet on the ice-edge, having cleared a vertical height of twelve feet. It seemed a marvelous jump for these small creatures to have made, and shows the rapidity with which they must move through the water to gain the impetus that enables them to clear a distance in vertical height four times greater than their own, and also how unerring must be their judgment in estimating the distance and height when performing this feat.

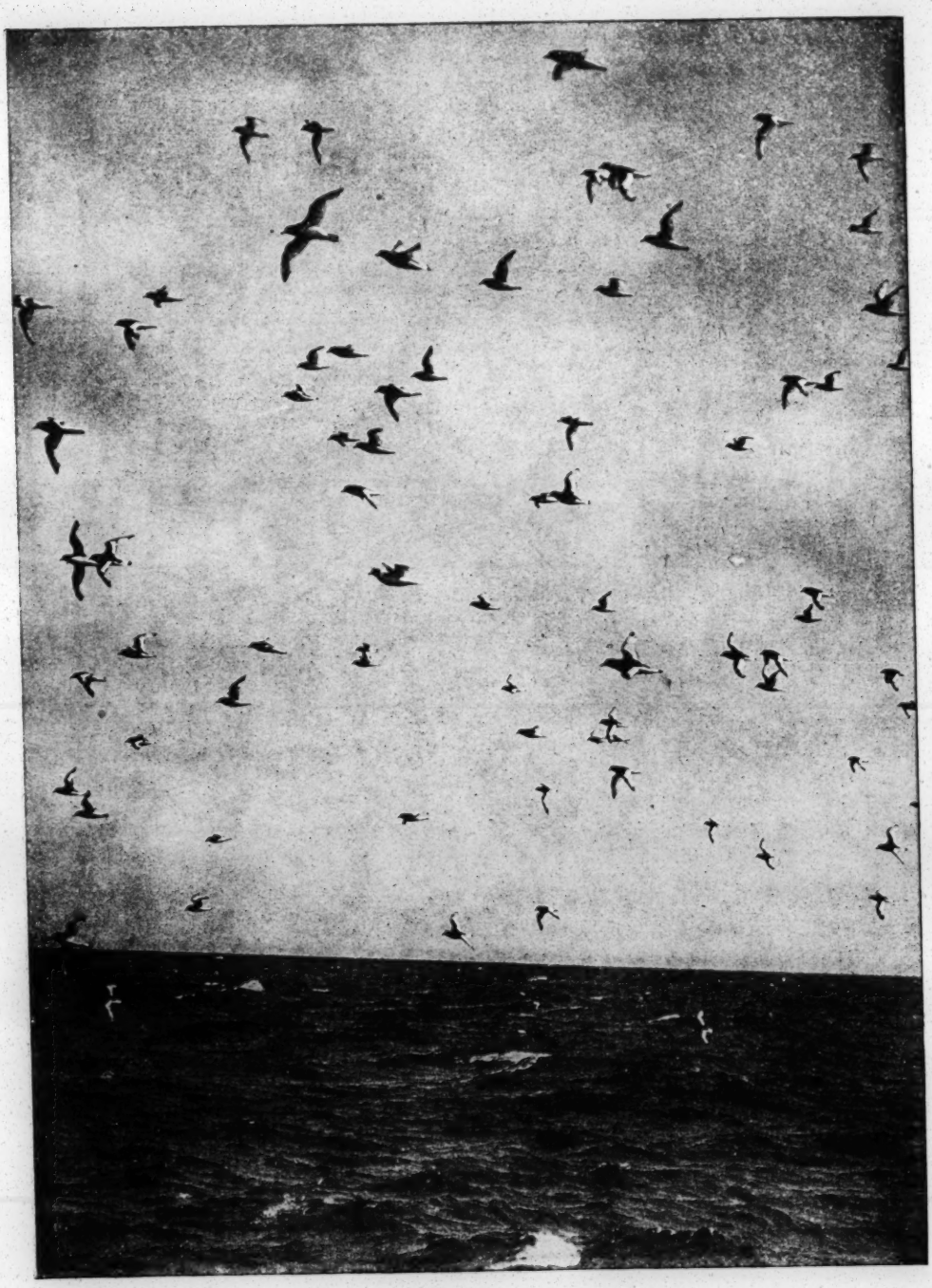
A blizzard interrupted the work of landing our supplies and buried everything under a thick mantle of snow.

The next four or five days were spent in using pick and shovel and iron crowbars on the envelope of ice that covered our cases, corners of which only peeped out from the mass. The whole had the appearance of a piece of the sweet known as almond rock, and there was as much difficulty in getting the cases clear of the ice as would be experienced if one tried to separate almonds from that sticky conglomerate without injury. Occasionally the breaking out of a case would disclose another which could be easily extracted, but more often each case required the pick or crowbars. A couple of earnest miners might be seen delving and hewing the ice off a case, of which only the corner could be seen, and after ten minutes' hard work it would be hauled up, and the stenciled mark of its contents exposed to view.

Brocklehurst took great interest in the recovery of the chocolate, and during this work took charge of one particular case which had been covered by the ice. He carried it himself up to the hut so as to be sure of its safety, and he was greeted with joy by the Professor, who recognized in the load some of his scientific instruments which were playing the part of the cuckoo in an old chocolate box. Needless to say Brocklehurst's joy was not as heartfelt as the Professor's.

THE WINTER HOUSE BROUGHT FROM ENGLAND

Our winter headquarters was not a very spacious dwelling for the accommo-



FLIGHT OF ANTARCTIC PETRELS

LANDING STORES FROM THE BOAT AT THE FIRST LANDING PLACE AFTER THE ICE-FOOT HAD BROKEN AWAY

dation of fifteen persons, but our narrow quarters were warmer than if the hut had been larger.

The length inside was 33 feet, the breadth 19 feet, and the height to the eaves 8 feet. Between the outer wall and the inside lining of match-boarding, there was a space of about four inches, which was filled with granulated cork, serving to preserve the heat and keep out the cold. The outside was made of inch tongue-and-groove boarding, and a sloping roof, with a gable at each end and two ventilators, brought the total height up to 14 feet. The roof was double, but we did not fill the space between the two linings with cork, contenting ourselves with a double layer of felt over the outside roof, across which battens were nailed to protect the felt from the wind. While the felt was being nailed on, an Antarctic breeze came up, and some of the covering was stripped off. We found it hung up against rocks more than a mile away to the north, and eventually the work had to be done over again.

The first thing done was to peg out a space for each individual, and we saw that the best plan would be to have the space allotted in sections, allowing two persons to share one cubicle. This space for two men amounted to six feet six inches in length and seven feet in depth from the wall of the hut towards the center. There were seven of these cubicles, and a space for the leader of the expedition; thus providing for the fifteen who made up the shore party.

THE PONIES GET SICK

It seems to be generally assumed that a Manchurian pony can drag a sledge over a broken trail at the rate of 20 to 30 miles a day, pulling not less than 1,200 pounds. Some authorities even put the weight to be hauled at 1,800 pounds, but this is, I think, far too heavy a load. It was a risk to take ponies from the far north through the tropics and then across 2,000 miles of stormy sea on a very small ship, but I had felt that if it could be done it would be well worth the trouble, for, compared with the dog, the pony is a far more efficient animal, one pony doing the work of at least ten dogs on the food allowance for ten dogs, and traveling a longer distance in a day.

We established ourselves at the winter quarters with eight ponies, but unfortunately we lost four of them within a month of our arrival. The loss was due, in the case of three of the four, to the fact that they were picketed when they first landed on sandy ground, and it was not noticed that they were eating the sand. I had neglected to see that the animals had a supply of salt given to them, and as they found a saline flavor in the volcanic sand under their feet, due to the fact that the blizzards had sprayed all the land near the shore with sea water, they ate it at odd moments.

All the ponies seem to have done this, but some were more addicted to the habit than the others. Several of them became ill, and we were quite at a loss to account for the trouble until Sandy died. Then a post-mortem examination revealed the fact that his stomach contained many pounds of sand, and the cause of the illness of the other ponies became apparent. We shifted them at once from the place where they were picketed, so that they could get no more sand, and gave them what remedial treatment lay in our power, but two more died in spite of all our efforts.

EREBUS, THE SENTINEL OF THE GREAT ICE BARRIER

On coming out of the hut one had only to go round the corner of the building in order to catch a glimpse of Mount Erebus, which lay directly behind us. Its summit was about fourteen miles from our winter quarters, but its slopes and foothills commenced within three-quarters of a mile of the hut.

Standing as a sentinel at the gate of the Great Ice Barrier, Erebus forms a magnificent picture. The great mountain rises from sea-level to an altitude of over 13,000 feet, looking out across the Barrier, with its enormous snow-clad bulk towering above the white slopes that run up from the coast. At the top of the

mountain an immense depression marks the site of the old crater, and from the side of this rises the active cone, generally marked by steam or smoke. The ascent of such a mountain would be a matter of difficulty in any part of the world, hardly to be attempted without experienced guides, but the difficulties were accentuated by the latitude of Erebus.

The observer taking the meteorological observations every two hours had the mountain in sight, and as Erebus was our high-level meteorological observatory, to the crown of which we always looked for indications of wind-currents at that elevation, we naturally saw every phase of activity produced by the fires within. It was for this reason, no doubt, that during the period of our stay in these regions, more especially through the winter months, we were able to record a fairly constant condition of activity on the mountain. It became quite an ordinary thing to hear reports from men who had been outside during the winter that there was a "strong glow on Erebus." These glows at times were much more vivid than at others. On one particular occasion, when the barometer showed a period of extreme depression, the glow was much more active, waxing and waning at intervals of a quarter of an hour through the night, and at other times we have seen great bursts of flame crowning the crater.

The huge steam column that rises from the crater into the cold air shot up at times to a height of 3,000 or 4,000 feet before spreading out and receiving its line direction from the air-currents at that particular hour holding the upper atmosphere. There were occasions when the view of this steam cloud became much more vivid, and we found that the best view that could be obtained was when the moon, rising in the eastern sky, passed behind the summit of the mountain. Then, projected on the disc of the moon, we could see the great cloud traveling upward, not quietly, but impelled by force from below.

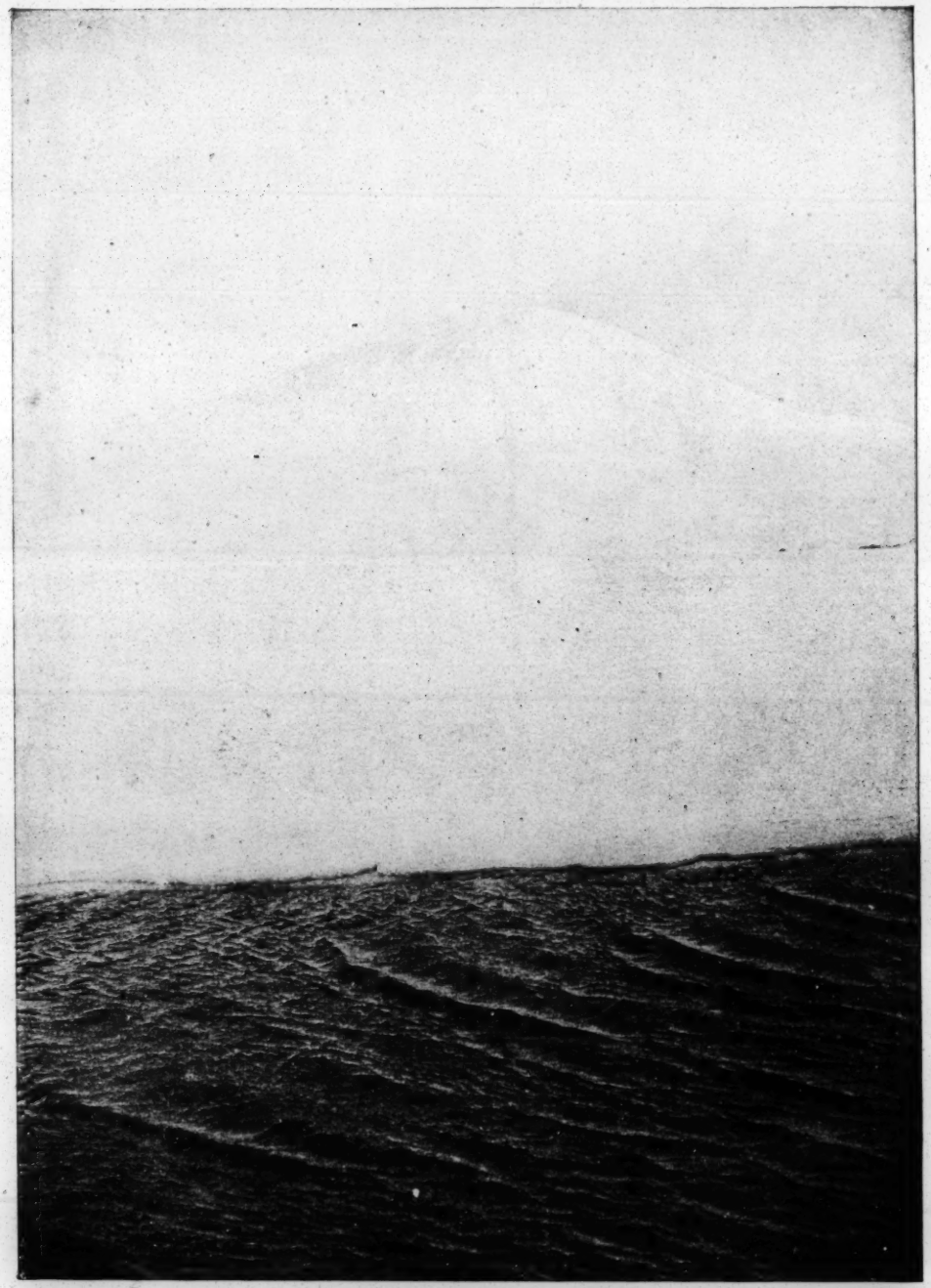
There were times also when it was obvious that the molten lava in the crater could not have been very far from the lip of the cup, for we could see the deep-red glow reflected strongly on the steam cloud. We often speculated as to the course the lava stream would take and its probable effect on the great glaciers and snow-fields flanking the sides of the mountain, should it ever overflow. These sudden uprushes were obviously the result of a vast steam explosion in the interior of the volcano and were sufficient proofs that Erebus still possesses considerable activity.

THE ASCENT OF EREBUS.

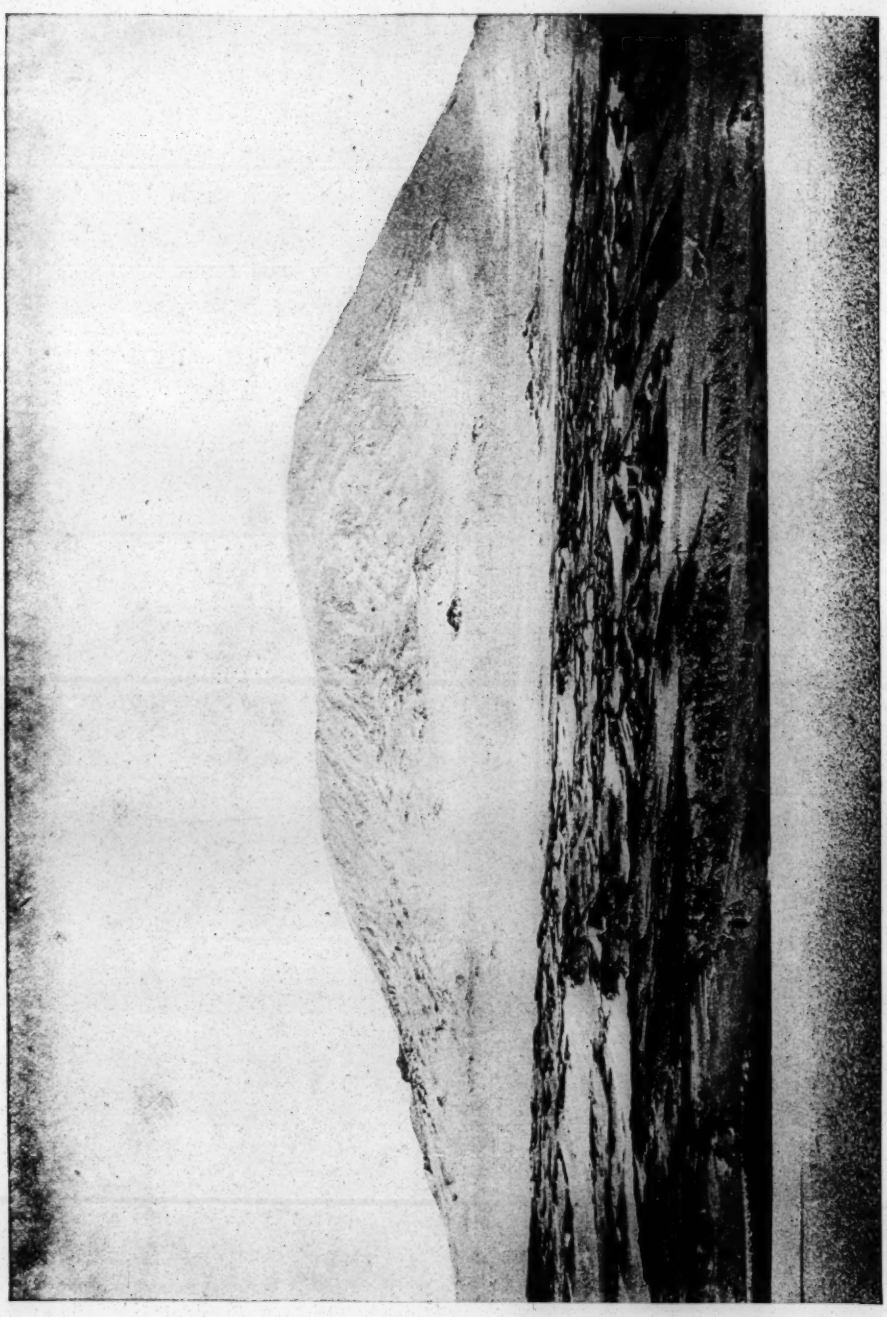
Before the winter set in, several members of the party climbed to the summit of Erebus. Their achievement will rank high among mountain climbs, for the party was compelled to endure temperatures of below zero, to fight through raging blizzards, and often the ascent was so steep as to be nearly insurmountable. From the summit they could look down into the fiery chasm of the volcano.

"We stood on the verge of a vast abyss, and at first could see neither to the bottom nor across it on account of the huge mass of steam filling the crater and soaring aloft in a column 500 to 1,000 feet high. After a continuous loud hissing sound, lasting for some minutes, there would come from below a big dull boom, and immediately great globular masses of steam would rush upward to swell the volume of the snow-white cloud which ever sways over the crater. This phenomenon recurred at intervals during the whole of our stay at the crater. Meanwhile, the air around us was extremely redolent of burning sulphur. Presently a pleasant northerly breeze fanned away the steam cloud, and at once the whole crater stood revealed to us in all its vast extent and depth.

"Mawson's angular measurement made the depth 900 feet and the greatest width about half a mile. There were at least three well-defined openings at the bottom of the cauldron, and it was from these that the steam explosions pro-



MOUNT EREBUS FROM THE ICE-FOOT



MOUNT EREBUS AS SEEN FROM THE WINTER QUARTERS, THE OLD CRATER ON THE LEFT, AND THE ACTIVE CONE RISING ON THE RIGHT

ceeded. Near the southwest portion of the crater there was an immense rib in the rim, perhaps 300 to 400 feet deep. The crater wall opposite the one at the top of which we were standing presented features of special interest. Beds of dark pumiceous lava or pumice alternated with white zones of snow. There was no direct evidence that the snow was bedded with the lava, though it was possible that such may have been the case. From the top of one of the thickest of the lava or pumice beds, just where it touched the belt of snow, there rose scores of small steam jets all in a row. They were too numerous and too close together to have been each an independent fumarole; the appearance was rather suggestive of the snow being converted into steam by the heat of the layer of rock immediately below it."

Two features of the geology of Erebus which are specially distinctive are the vast quantities of large and perfect feldspar crystals and the ice fumaroles. The crystals are from two to three inches in length. Many of them have had their angles and edges slightly rounded by attrition, through clashing against one another when they were originally projected from the funnel of the volcano, but numbers of them are beautifully perfect. The fluid lava which once surrounded them has been blown away in the form of fine dust by the force of steam explosions, and the crystals have been left behind intact.

The ice fumaroles are specially remarkable. About fifty of these were visible to us on the track which we followed to and from the crater, and doubtless there were numbers that we did not see. These unique ice-mounds have resulted from the condensation of vapor around the orifices of the fumaroles. It is only under conditions of very low temperature that such structures could exist. No structures like them are known in any other part of the world.

LIFE DISCOVERED IN THE ICE DURING THE WINTER

On March 13 we experienced a very fierce blizzard. The hut shook and rocked in spite of our sheltered position, and articles that we had left lying loose outside were scattered far and wide. Even cases weighing from 50 to 80 pounds were shifted from where they had been resting, showing the enormous velocity of the wind. When the gale was over we put everything that was likely to blow away into positions of greater safety.

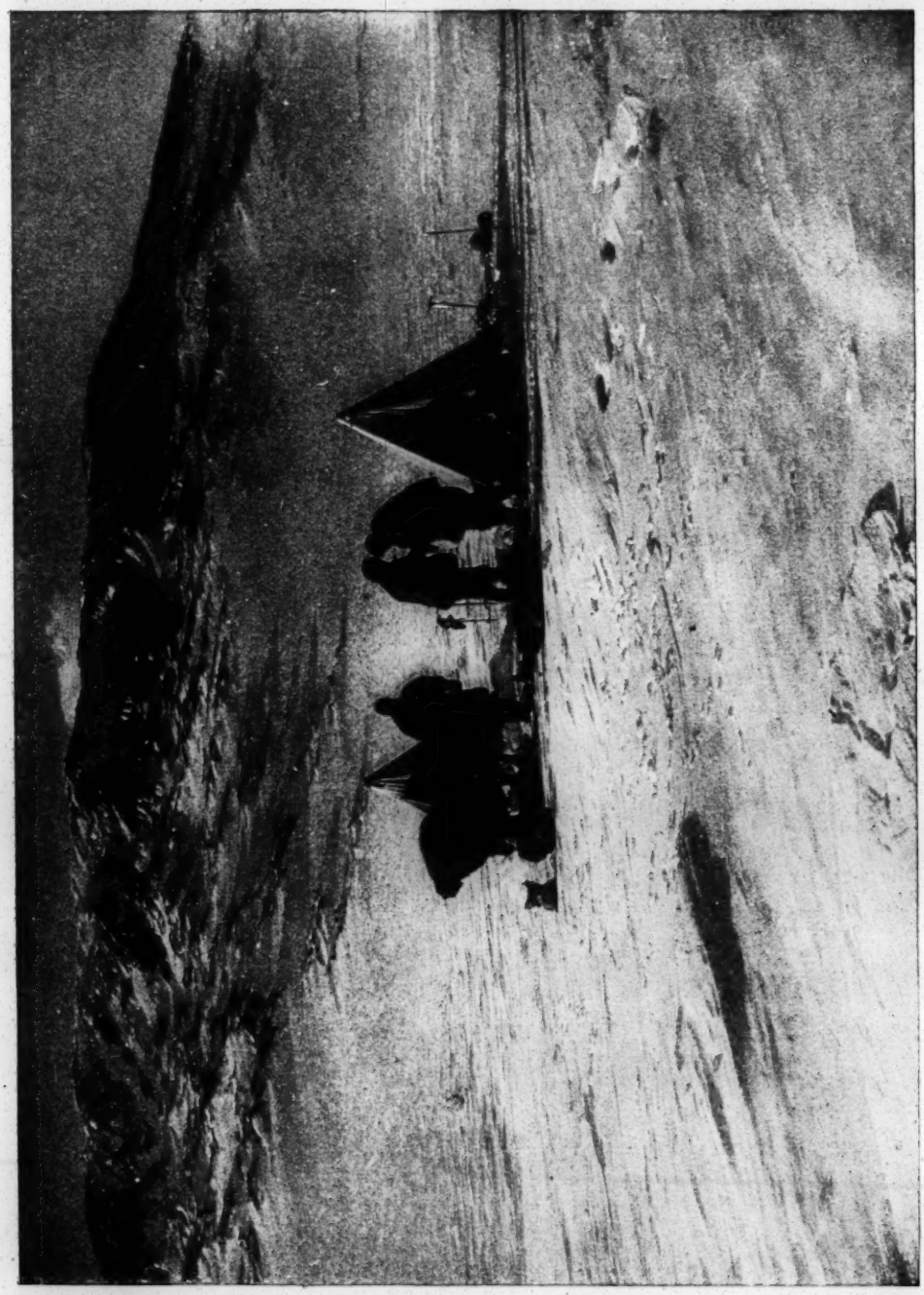
It was on this day also that Murray found living microscopical animals on some fungus that had been thawed out from a lump of ice taken from the bottom of one of the lakes. This was one of the most interesting biological discoveries that had been made in the Antarctic, for the study of these minute creatures occupied our biologist for a great part of his stay in the south, and threw a new light on the capability of life to exist under conditions of extreme cold and in the face of great variations of temperature.

We all became vastly interested in the rotifers during our stay, and the work of the biologist in this respect was watched with keen attention. From our point of view there was an element of humor in the endeavors of Murray to slay the little animals he had found. He used to thaw them out from a block of ice, freeze them up again, and repeat this process several times without producing any result as far as the rotifers were concerned. Then he tested them in brine so strongly saline that it would not freeze at a temperature above minus 7° Fahr., and still the animals lived. A good proportion of them survived a temperature of 200° Fahr. It became a contest between rotifers and scientist, and generally the rotifers seemed to triumph.

THE SOUTHERN PARTY

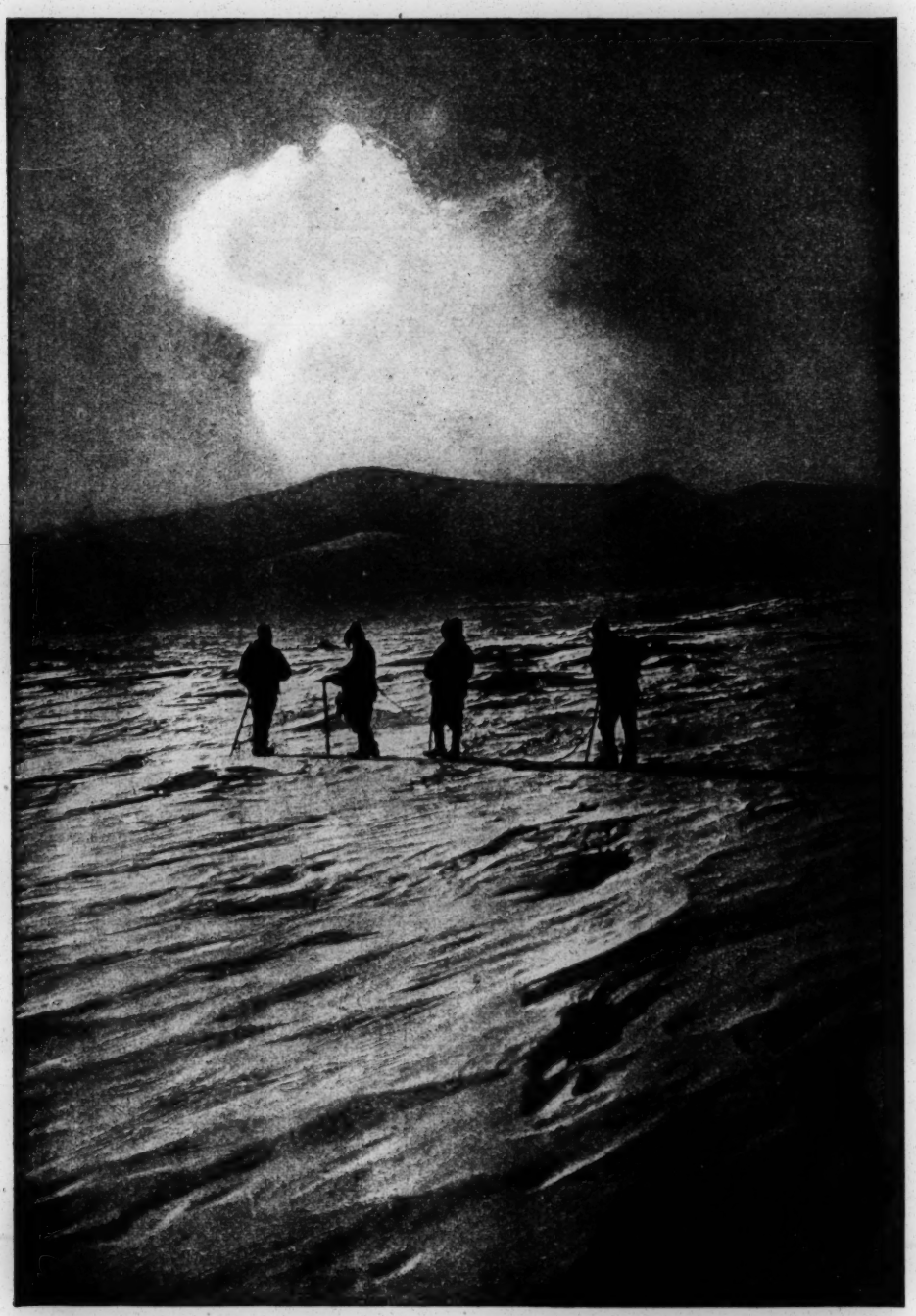
The southern party, consisting of Shackleton, Adams, Marshall, and Wild, left the winter quarters October 29, 1908, and for five weeks headed up the Ice Barrier.

On November 26 we camped in latitude 82° 18½′ south, longitude 168° east, having passed the "furthest south"



THE CAMP 7,000 FEET UP MOUNT EREBUS: THE STEAM FROM THE ACTIVE CRATER CAN BE SEEN

BROCKLEHURST LOOKING DOWN FROM A POINT 9,000 FEET UP MOUNT EREBUS: THE CLOUDS LIE BELOW, AND CAPE ROYDS CAN BE SEEN

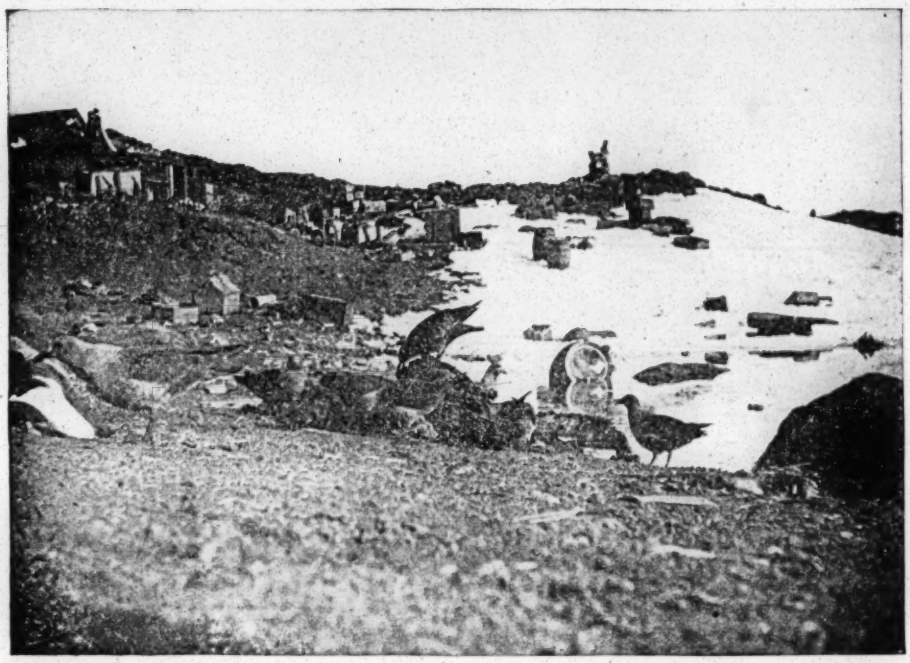


ONE THOUSAND FEET BELOW THE ACTIVE CONE OF MOUNT EREBUS

THE CRATER OF EREBUS, 900 FEET DEEP AND HALF A MILE WIDE: STEAM IS SEEN RISING ON THE LEFT

The photograph was taken from the lower part of the crater edge

A REMARKABLE FUMAROLE IN THE OLD CRATER, IN THE FORM OF A COUCHANT LION: THE MEN (FROM THE LEFT) ARE: MACKAY, DAVID, ADAMS, MARSHALL



SKUA GULLS FEEDING NEAR THE HUT AT CAPE ROYDS

record. New land had come within our range of vision by this time, owing to the fact that we were far out from the base of the mountains, and I had noted with some anxiety that the coast trended south-southeast, thus threatening to cross our path and obstruct the way to the pole. We could see great snow-clad mountains rising beyond Mount Longstaff, and also far inland to the north of Mount Markham. On November 26 we opened out Shackleton Inlet, and looking up it sighted a great chain of mountains, while to the west of Cape Wilson appeared another chain of sharp peaks, about 10,000 feet high, stretching away to the north beyond Snow Cape, and continuing the land on which Mount A. Markham lies.

The first pony had been killed on November 21, when we were south of the 81st parallel, and we had left a depot of pony meat and ordinary stores, to provide for the return march. We started at once to use pony meat as part of the daily ration, and soon found that scraps of raw, frozen meat were of assistance on the march in maintaining our strength and cooling our parched throats. A second pony was shot on November 28, and a third on December 1, by which time we were closing in on the land, and it had become apparent that we would have to find a way over the mountains if we were to continue the southern march.

We were still sighting new land ahead, and the coast line had a more distinct easterly trend. We camped on December 2 in latitude 83° 28′ south, longitude 171° 30′ east, opposite a red granite mountain about 3,000 feet in height. On the following day we climbed this mountain, and from its summit saw an enormous glacier, stretching almost due south, flanked by huge mountains, and issuing on to the Barrier south of our camp. We decided at once that we had better ascend the glacier, and on the following day made our way, with two sledges and the last pony, on to its surface.

DERRICK POINT, SHOWING THE METHOD OF HAULING STORES UP THE CLIFF

ASCENDING A GLACIER WHICH WAS 130 MILES IN LENGTH

We encountered difficulties at once, for the snow-slopes by means of which we gained the glacier surface gave way to blue ice, with numberless cracks and crevasses, many of them razor-edged. Traveling on this surface in finnesko was slow and painful work.

On December 5 Marshall and Adams, who were ahead looking for a route, reported that at a point close to the granite cliffs a bird, brown in color, with a white line under each wing, had flown over their heads. They were sure it was not a skua gull, the only bird likely to have been attracted by the last dead pony. It was a curious incident to occur in latitude 83° 40′ south. We left the fourth depot close to the foot of the glacier at the foot of a wonderful granite cliff, polished by the winds and snows of ages. On December 6 we took six hours to pass about 600 yards of severely crevassed ice, over which all our gear had to be relayed, and on the following day we lost the last pony, which fell into a crevasse disguised, like so many others, by a treacherous snow-lid. Wild was leading the pony with one sledge, while Adams, Marshall, and myself went on ahead with the other sledge and pioneered a practical path. We had passed over a snow-covered crevasse without noticing it, but the greater weight of the pony broke through the lid, and the animal dropped through, probably to a depth of several hundreds of feet. Happily the swingle-tree snapped with a sudden strain, and Wild and the sledge were saved. This accident left us with two sledges and a weight of about 250 pounds per man to haul. Our altitude at this time was about 1,700 feet above sea-level.

During the days that followed we made steady progress up the glacier, experiencing constant difficulty with the crevasses. We hauled well ahead of the sledges, so that when one of us dropped through a snow-lid the harness would support him until he could be hauled up again. We had many painful falls as a result of having no footgear suitable for the ice-climbing, and any future travelers would do well to take boots with spikes. A special form would have to be devised, on account of the low temperature rendering impracticable the use of ordinary mountaineering boots.

COAL AND FOSSIL WOOD DISCOVERED

New land appeared day after day, and we were able to make small geological collections and to take some photographs. The rocks were sedimentary, the lines of stratification often showing clearly on the mountain sides, and we made two geological discoveries of the first importance. In latitude 85° south, Wild, who had climbed the slope of a mountain in

order to look ahead, found coal, six seams ranging from 4 inches to 7 or 8 feet in thickness, with sandstone intervening. Close to this point I found a piece of sandstone showing an impression, and microscopic investigation has shown that this was fossil coniferous wood.

The glacier proved to be about 130 miles in length, rising to an altitude of over 9,000 feet. Christmas day, 1908, found us in latitude 85° 55′ south, a plateau with ice-falls appearing to the south. Much glaciated land trended to the southeast, apparently ending in a high mountain shaped like a keep. The land to the west had been left behind. It was evident that we were still below the plateau level, and, though we were getting free of crevasses, we were hindered by much soft snow. The level was rising in a series of steep ridges about 7 miles apart. We had started to reduce rations before leaving the Barrier surface, and by Christmas day were marching on very short commons. Our temperature was 2° subnormal, but otherwise we were well and fit.

On December 31 we camped in latitude 86° 54′ south. We had not yet reached the plateau level, for slopes still lay ahead, and our altitude was about 10,000 feet. We had three weeks' food on a reduced ration, and were 186 geographical miles from the pole. The land had been left behind, and we were traveling over a white expanse of snow, still with rising slopes ahead. We were weakening from the combined effects of short food, low temperature, high altitude, and heavy work. We were able to march on the first six days of January, and on the night of January 6 camped in latitude 88° 7′ south. We had increased the daily ration, for it had become evident that vitality could not be maintained on the amount of food we had been taking. I had been forced to abandon the hope of reaching the pole, and we were concentrating our efforts on getting within 100 miles of the goal.

CAUGHT IN A BLIZZARD

A fierce blizzard blew on January 7 and 8, and made any march impossible. We lay in our sleeping bags, frequently attacked by frost-bite. The following paragraphs are quoted from my diary.

"January 7.—A blinding, shrieking blizzard all day, with the temperature ranging from 60° to 70° of frost. It has been impossible to leave the tent, which is snowed up on the lee side. We have been lying in our bags all day, only warm at food time, with fine snow making through the walls of the worn tent and covering our bags. We are greatly cramped. Adams is suffering from cramp every now and then. We are eating our valuable food without marching.

The wind has been blowing 80 to 90 miles an hour. We can hardly sleep. Tomorrow I trust this will be over. Directly the wind drops we march as far south as possible, then plant the flag and turn homeward. Our chief anxiety is that our tracks may drift up, for to them we must trust mainly to find our depot; we have no land bearings in this great plain of snow. It is a serious risk that we have taken, but we had to play the game to the utmost, and Providence will look after us.

January 8.—Again all day in our bags, suffering considerably physically from cold hands and feet and from hunger, but more mentally, for we cannot get on south, and we simply lie here shivering. Every now and then one of our party's feet go, and the unfortunate beggar has to take his leg out of the sleeping bag and have his frozen foot nursed into life again by placing it inside the shirt, against the skin, of his almost equally unfortunate neighbor.

We must do something more to the south, even though the food is going, and we weaken lying in the cold, for with 72° of frost the wind cuts through our thin tent, and even the drift is finding its way in and on to our bags, which are wet enough as it is. Cramp is not uncommon every now and then, and the

PORTAGING THE SLEDGE OVER A PATCH OF BARE ROCK

drift all round the tent has made it so small that there is hardly room for us at all. The wind has been blowing hard all day; some of the gusts must be over 70 or 80 miles an hour.

This evening it seems as though it were going to ease down, and directly it does we shall be up and away south for a rush. I feel that this march must be our limit. We are so short of food, and at this high altitude, 11,600 feet, it is hard to keep any warmth in our bodies between the scanty meals. We have nothing to read now, having depoted our little books to save weight, and it is dreary work lying in the tent with nothing to read, and too cold to write much in the diary.

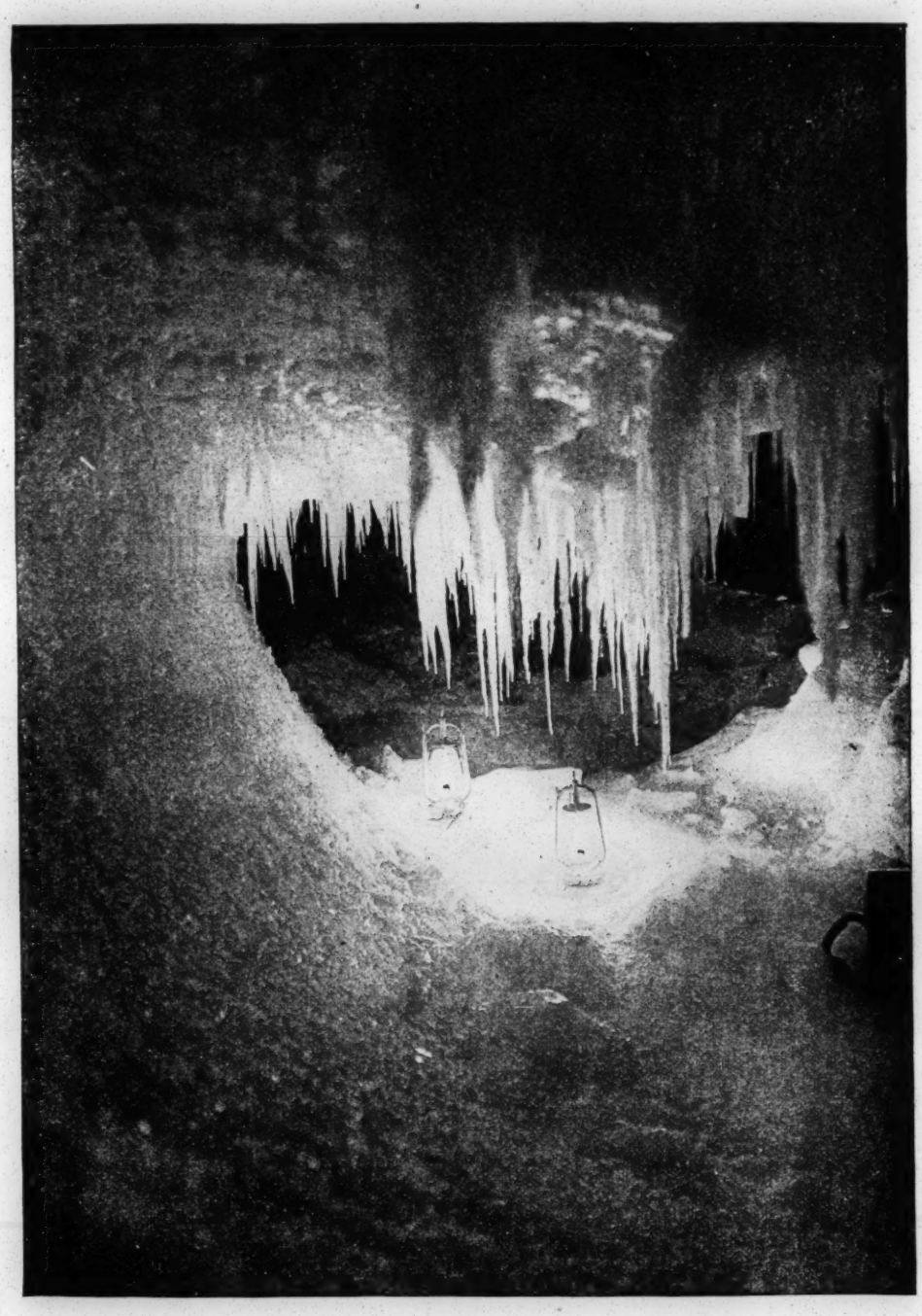
110 MILES FROM THE SOUTH POLE

January 9.—Our last day outward. We have shot our bolt, and the tale is latitude 88° 23′ south, longitude 162° east. The wind eased down at 1 a. m., and at 2 a. m. we were up and had breakfast. At 4 a. m. we started south, with the Queen's Union Jack, a brass cylinder containing stamps and documents to place at the farthest south point, camera, glasses, and compass. At 9 a. m. we were in 88° 23′ south, half running and half walking over a surface much hardened by the recent blizzard. It was strange for us to go along without the nightmare of a sledge dragging behind us.

We hoisted her Majesty's flag and the other Union Jack afterwards, and took possession of the plateau in the name of his Majesty. While the Union Jack blew out stiffly in the icy gale that cut us to the bone, we looked south with our powerful glasses, but could see nothing but the dead white snow plain. There was no break in the plateau as it extended toward the pole, and we feel sure that the goal we have failed to reach lies on this plain.

We stayed only a few minutes, and then, taking the Queen's flag and eating our scanty meal as we went, we hurried back and reached our camp about 3 p. m.

SLEDGING ON THE BARRIER BEFORE THE RETURN OF THE SUN: MOUNT EREBUS IN THE BACKGROUND. TEMPERATURE, 58° FAHRENHEIT BELOW ZERO



AN ICE CAVERN IN THE WINTER: PHOTOGRAPHED BY THE LIGHT OF HURRICANE LAMPS

We were so dead tired that we only did an hour's march in the afternoon and camped at 5 p. m. The temperature was minus 19° Fahr. Fortunately for us, our tracks were not obliterated by the blizzard; indeed, they stood up, making a trail easily followed. Homeward bound at last. Whatever regrets may be, we have done our best."

THE HOMEWARD MARCH

The homeward march was rendered difficult by shortage of food and attacks of dysentery due to the meat from one of the ponies.

We had a strong wind behind us day after day during this period, and this contributed in a very large measure to our safety, for in the weakened condition we had then reached we could not have made long marches against a head wind, and without long marches we would have starved between the depots. We had a sail on the sledge, formed of the floor cloth of a tent, and often the sledge would overrun us, though at other times it would catch in a drift and throw us heavily.

The results of the southern journey may be summarized briefly. We found that a chain of great mountains stretched north by east from Mount Markham as far as the 86th parallel, and that other ranges ran toward the southwest, south, and southeast between the 84th and the 86th parallels. We ascended one of the largest glaciers in the world on to a high plateau, which in all probability is a continuation of the Victoria Land plateau. The geographical pole almost certainly lies on this plateau, at an altitude of between 10,000 and 11,000 feet above sea-level. The discovery of coal and fossil wood has a very important bearing on the question of the past geological history of the Antarctic continent.

FROSTBITE AND SUNBURN AT THE SAME TIME

When we were traveling along during the early part of the journey over the level Barrier surface, we felt the heat of the sun severely, though as a matter of fact the temperature was generally very low, sometimes as low as zero Fahr., though the season was the height of summer. It was quite usual to feel one side of the face getting frozen while the other side was being sunburned. The ponies would have frozen perspiration on their coats on the sheltered side, while the sun would keep the other side hot and dry, and as the day wore on and the sun moved round the sky the frosted area on the animals would change its position in sympathy.

I remember that on December 4 we were marching stripped to our shirts, and we got very much sunburned, though at noon that day the air temperature showed ten degrees of frost. When we started to climb the glacier and marched close to the rocks, we felt the heat much more, for the rocks acted as radiators, and this experience weighed with me in deciding to leave all the spare clothing and equipment at the Upper Glacier depot, about 7,000 feet up. We did not expect to have to climb much higher, but we did not reach the plateau until we had climbed over 10,000 feet above sea-level, and so we felt the cold extremely. Our wind-proof Burberry clothing had become thin by this time, and had been patched in many places in consequence of having been torn on the sharp ice.

The wind got in through a tear in my Burberry trousers one day and I was frost-bitten on the under part of the knee. This frost-bite developed into an open wound, into which the wool from my underclothing worked, and I had finally to perform a rather painful operation with a knife before the wound would heal. We were continually being frost-bitten up on the plateau, and when our boots had begun to give out and we were practically marching on the sennegrass inside the finnesko our heels got frost-bitten. My heels burst when we got on to hard stuff, and for some time my socks were caked with blood at the end of every day's march. Finally Marshall put some "newskin" on a pad, and that stuck on well until the cracks had healed. The scars are likely to remain with me.

AN ICE CAVE IN THE WINTER

In the very cold days, when our strength had begun to decrease, we found great difficulty in hoisting the sail on our sledge, for when we lifted our arms above our heads in order to adjust the sail the blood ran from our fingers and they promptly froze. Ten minutes or a quarter of an hour sometimes elapsed before we could get the sledge properly rigged. Our troubles with frost-bite were no doubt due in a measure to the lightness of our clothing, but there was compensation in the speed with which we were able to travel. I have no doubt at all that men engaged in polar exploration should be clothed as lightly as is possible, even if there is a danger of frost-bite when they halt on the march.

We would certainly not have traveled so fast had we been wearing the regulation pilot-cloth garment generally used in polar exploration. Our experience made it obvious that a party which hopes to reach the pole must take more food per man than we did, but how the additional weight is to be provided for is a matter of individual consideration. I would not take cheese again, for although it is a good food, we did not find it as palatable as chocolate, which is practically as sustaining. Our other foods were all entirely satisfactory.

THE DIVISION OF WORK

Each member of the southern party had his own particular duties to perform. Adams had charge of the meteorology, and his work involved the taking of temperatures at regular intervals, and the boiling of the hypsometer, sometimes several times in a day. He took notes during the day, and wrote up the observations at night in the sleeping bag. Marshall was the cosmographer and took the angles and bearings of all the new land; he also took the meridian altitudes and the compass variations as we went south. When a meridian altitude was taken, I generally had it checked by each member of the party, so that the mean could be taken.

Marshall's work was about the most uncomfortable possible, for at the end of a day's march, and often at lunch-time, he would have to stand in the biting wind handling the screws of the theodolite. The map of the journey was prepared by Marshall, who also took most of the photographs. Wild attended to the repair of the sledges and equipment, and also assisted me in the geological observations and the collection of specimens. It was he who found the coal close to the Upper Glacier depot. I kept the courses and distances, worked out observations, and laid down our directions. We all kept diaries. I had two, one my observation book and the other the narrative diary, reproduced in the first volume.

To the biologist, no more uninviting desert is imaginable than Cape Royds seemed when we made our first landing, and for long afterwards. Here is absolute desolation, a black and white wilderness, rugged ridges of lava alternating with snowdrifts for a few miles, ending to the north and south in crevassed glaciers, and eastward in the snow-field stretching up to the rocky crags of the cone of Mount Erebus.

On the very edge of the sea, the little colony of Adelie penguins and the scattered skua gulls relieved the monotony. Beyond was no living creature, no blade of grass, or tiniest patch of welcome green.

Bleak and bare though it was, this stretch of two or three miles of broken country, where rocky peaks and ridges, moraines and snow drifts diversified the surface, was the field of operations for the biologist. The white waste of glacier and snow-field was hopeless; the nearer country seemed little more promising.

The sea was there known to be teeming with varied life, but it was inaccessible till the ice should bridge it over.

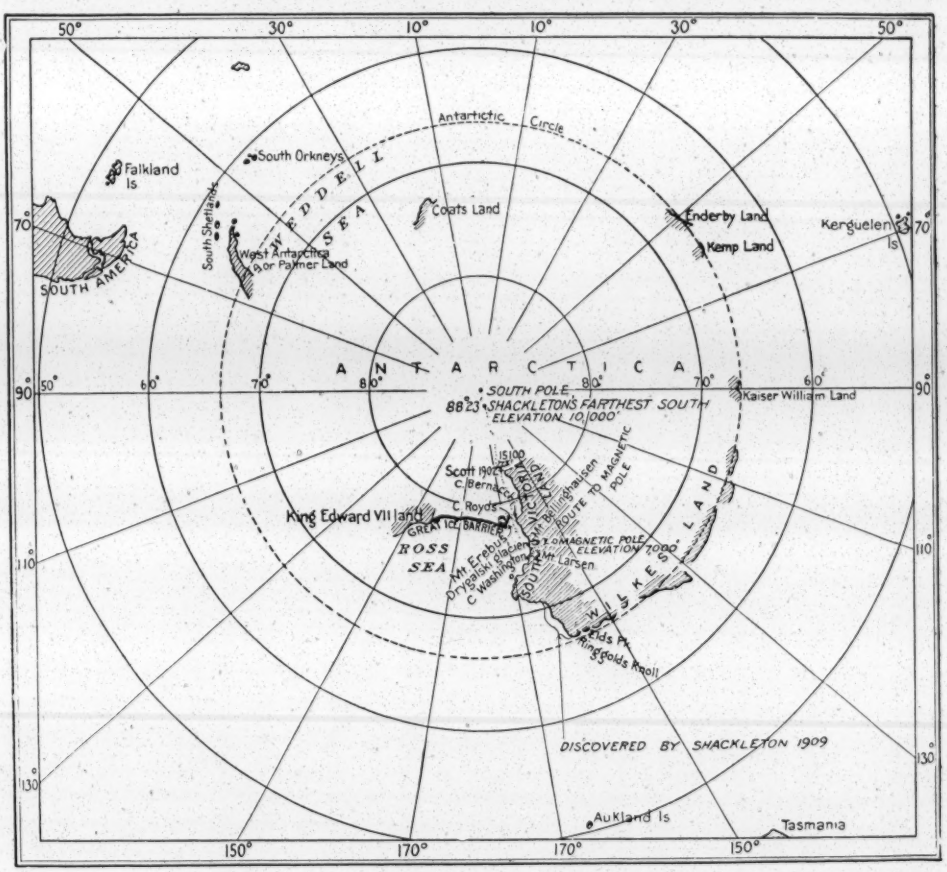
Water-bears were found to live while frozen in ice just as well as the rotifers did. It is an interesting fact that the only abundant species at Cape Royds is an Arctic species (*Macrobiotus arcticus*) which was only previously known in Spitzbergen and Franz Josef Land, and which has not yet been detected in the various collections made on the other

ICE FLOWERS ON NEWLY FORMED SEA ICE EARLY IN THE WINTER

side of the Antarctic by Bruce's and Nordenskjold's expeditions.

The mystery of the Great Ice Barrier has not been solved, and it would seem that the question of its formation and extent cannot be determined definitely until an expedition traces the line of the mountains round its southerly edge. A certain amount of light has been thrown on the construction of the Barrier, in that we were able, from observations and measurements, to conclude provisionally that it is composed mainly of snow. The Barrier still continues its recession, which has been observed since the voyage of Sir James Ross in 1842. There certainly appears to be a high snow-covered land on the 163d meridian, where we saw slopes and peaks, entirely snow covered, rising to a height of 800 feet, but we did not see any bare rocks, and did not have an opportunity to take soundings at this spot. We could not arrive at any definite conclusion on the point.

The journey made by the northern party resulted in the attainment of the South Magnetic Pole, the position of which was fixed, by observations made on the spot and in the neighborhood, at latitude 72° 25′ south, longitude 155° 16′ east. The first part of this journey was made along the coast-line of Victoria Land, and many new peaks, glaciers and ice-tongues were discovered, in addition to a couple of small islands. The whole of the coast traversed was carefully triangulated, and the existing map was corrected in several respects.



OUTLINE MAP OF SOUTH POLAR REGIONS

MRS GARDINER GREENE HUBBARD

Tribute of Respect to the Memory of Mrs Gardiner Greene Hubbard adopted by the Board of Managers of the National Geographic Society at a special meeting held at Hubbard Memorial Hall October 23, 1909.

THE death of Mrs Gardiner Greene Hubbard is to the National Geographic Society a great, an irreparable, loss, and to each member of the Board of Managers comes as a personal bereavement. Her broad and constant interest in the work of the Society, apparent during the decade in which her husband, Gardiner Greene Hubbard, served as its President, has since his death on December 11, 1907, been its greatest stimulus to renewed activity in the work to which he devoted so many years, and for the conduct of which he, twenty-one years ago, became the Society's first President. Her personal interest in its work in behalf of scientific geography and diffusion of geographic information among the people, her attendance upon its public meetings during the long years of its activities, and her individual recognition of the work performed by others in its behalf have been an inspiration to the officers of this Society, the members of the Board of Managers, the speaker upon the platform, and the editor at his desk, while her splendid gift of a building which became at once a home for the Society and a memorial to its founder and first President, now becomes of added interest as a memorial of her own generosity and a practical aid in the diffusion of information to all parts of the country and to all quarters of the world.

THE NORTH POLE

THE Board of Managers of the National Geographic Society, at a meeting held at Hubbard Memorial Hall November 4, 1909, received the following report:

The sub-committee to which was referred the task of examining the records of Commander Peary in evidence of his having reached the North Pole, beg to report that they have completed their task.

Commander Peary has submitted to this sub-committee his original journal and records of observations, together with all his instruments and apparatus, and certain of the most important of the scientific results of his expedition. These have been carefully examined by your sub-committee, and they are unanimously of the opinion that Commander Peary reached the North Pole on April 6, 1909.

They also feel warranted in stating that the organization, planning, and management of the expedition, its complete success, and its scientific results, reflect the greatest credit on the ability of Commander Robert E. Peary, and render him worthy of the highest honors that the National Geographic Society can bestow upon him.

HENRY GANNETT.
C. M. CHESTER.
O. H. TITTMANN.

The foregoing report was unanimously approved.

Immediately after this action the following resolutions were unanimously adopted:

WHEREAS, Commander Robert E. Peary has reached the North Pole, the goal sought for centuries,

WHEREAS, This is the greatest geographical achievement that this Society can have opportunity to honor, therefore

Resolved, That a special medal be awarded to Commander Peary.

Resolved, That the question of whether or not any one reached the North Pole prior to 1909 be referred to the Committee on Research with instructions to recommend to the Board of Managers a sub-committee of experts who shall have authority to send for papers or make such journeys as may be necessary to inspect original records, and that this action of the Society be communicated at once to those who may have evidence of importance.

Resolved, That in view of the able seamanship, pertinacious effort, and able management of Captain C. A. Bartlett, displayed during the Peary Arctic Expedition of 1908-1909, and that he reached the high latitude of 87° 40′ north, he be awarded a medal by the National Geographic Society.

At a meeting of the Board of Managers November 8, the Committee on Research of the Society recommended that the personnel of the committee to consider whether the pole was discovered before 1909 should be entirely different from that of the committee which passed on the Peary records. Upon their recommendation the Board appointed the following committee:

J. Howard Gore, formerly Professor of Mathematics, George Washington University, and author of several works on surveying and geodesy.

Rear Admiral John E. Pillsbury, U. S. N., who was for ten years in charge of the hydrographic office of the U. S. Navy, did important work investigating the gulf stream currents, was for several years Assistant Chief of the Bureau of Navigation of the Navy Department, and later Chief of Staff of the North Atlantic Squadron.

Dr C. Willard Hayes, Chief Geologist of the U. S. Geological Survey, one of the pioneer explorers of Alaska and of many sections of the Rocky Mountains.

PROGRAM OF MEETINGS OF THE NATIONAL GEOGRAPHIC SOCIETY 1909-10

Friday, 8.15 p. m., November 12—"The North Pole." Commander Robert E. Peary, U. S. Navy. Illustrated.

Friday, 8.15 p. m., November 19—"In Savage New Guinea." Mr Thomas Barbour, of Harvard University. An account of the strange people and extraordinary scenery of this little-known island by the author of the two fascinating articles, "Notes on New Guinea," recently published in the NATIONAL GEOGRAPHIC MAGAZINE. Illustrated.

Friday, 8.15 p. m., November 26—"A Rollicking Ramble in Ireland." Mr Seumas McManus, author of "A Lad of the O'Friel's," "Through the Turf Smoke," "Donegal Fairy Stories," "Ballads of a Country Boy," etc. Illustrated.

Friday, 8.15 p. m., December 3—"Children of Many Lands." Mr O. P. Austin, Secretary of the National Geographic Society and Chief of the U. S. Bureau of Statistics. Illustrated.

Friday, 8.15 p. m., December 10—"Spain and Her People." Dr Charles Upson Clark, of Yale University. The speaker will describe the romance and grandeur and present conditions in the country. Illustrated.

Wednesday, 7.30 p. m., December 15—Annual Banquet.

Friday, 8.15 p. m., December 17—"The Untamed Girdle of Palestine." Mr Ellsworth Huntington, of Yale University. A two weeks' expedition on the Dead Sea with a canvas boat, a trip to the famous Rock City of Petra, by way of the desolate Ghor, and an excursion to the little-known Negen, south of Beersheba. Illustrated.

Friday, 8.15 p. m., January 7—"Manchuria; the Antung Mukden Railway; the funeral of the late Empress Dowager, November 9, 1909." Miss Eliza R. Scidmore, author of "China—the Long Lived Empire," "Jinrikisha Days in Japan," etc. Illustrated.

Friday, 8.15 p. m., January 14—(The subject will be announced later.) Mr John Barrett, Director International Bureau of American Republics. Illustrated.

Friday, 8.15 p. m., January 21—"The Life of the Nest; Studies of the Nesting Habit of Birds." Frank M. Chapman, author of "Camps and Cruises of an Ornithologist," "Bird Studies with a Camera," etc. Illustrated.

Friday, 8.15 p. m., January 28—"The Ottoman Empire." Rear Admiral Colby M. Chester, U. S. Navy. From June, 1908, to May, 1909, inclusive, Admiral Chester lived in Constantinople or was traveling throughout Asia Minor. He was thus a witness of the revolution and of the beginning of the new era in Turkey. Illustrated.

Friday, 8.15 p. m., February 4—"Mountaineering in a New Switzerland." Professor

Charles E. Fay, of Tufts College, formerly President American Alpine Club. Illustrated by personal experiences and views gathered during sixteen seasons passed by the lecturer in the Canadian Rockies and Selkirks.

Friday, 8.15 p. m., February 11—"The Waterways of Empire." Mr Willis Fletcher Johnson, Associate Editor of New York Tribune. An account of the part which rivers, canals, and other narrow waterways have played in the political and commercial history of the world, and especially of this country. Illustrated.

Friday, 8.15 p. m., February 18—"The Glaciers of Alaska; an Account of the National Geographic Society Expedition to Alaska in 1909." Professor Lawrence F. Martin, of the University of Wisconsin, and, with Professor Ralph S. Tarr, of Cornell University, leader of the Society's Expedition. Illustrated.

Friday, 8.15 p. m., February 25—"The Panama Canal." It is hoped that official duties will permit Colonel George W. Goethals, Chief Engineer of the Panama Canal, to accept the invitation of the National Geographic Society to address the Asociation on this subject.

Friday, 8.15 p. m., March 4—"Physical Problems of Our Country." Mr Gifford Pinchot, Chief of the U. S. Forest Service. Illustrated.

Friday, 8.15 p. m., March 11—"The Waste of Human Life and Resources in the Mining Industry." Mr Joseph A. Holmes, of the U. S. Geological Survey. Dr Holmes will tell of the Government's efforts to stem the tide of fatalities in which the United States leads the world at a ratio of three to one and the Government's efforts to devise ways of saving the great waste not only of human life but of our coal, gas, and other mineral resources. Illustrated.

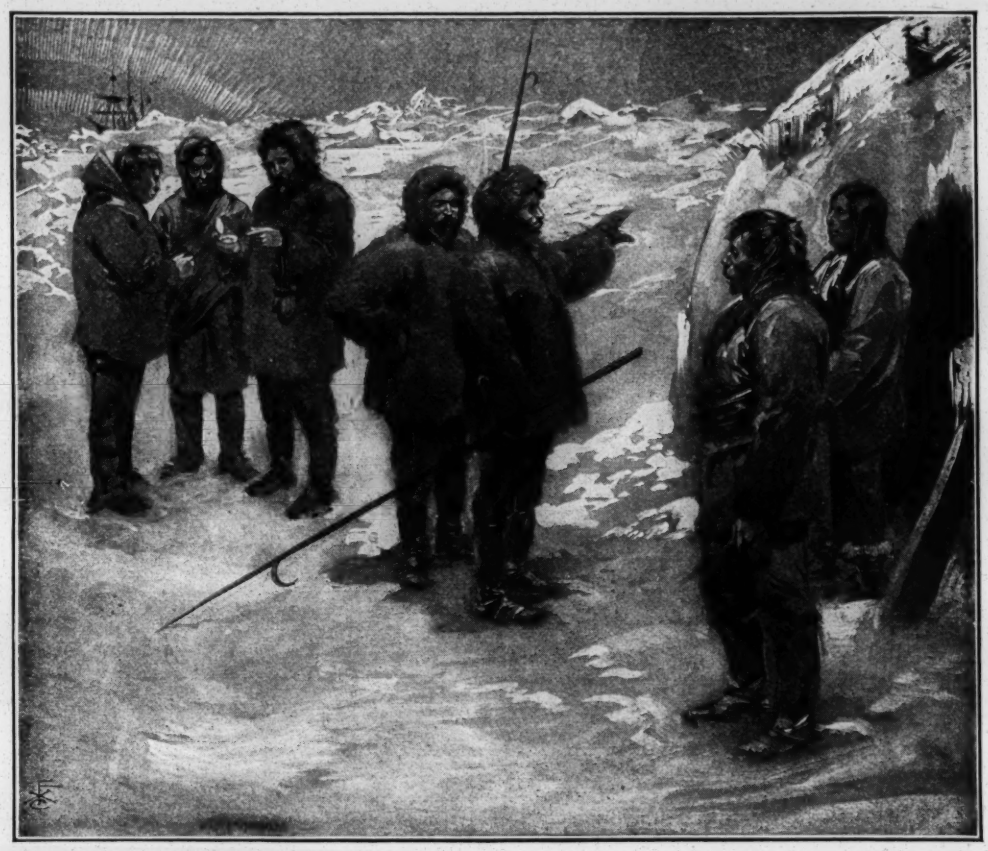
Friday, 8.15 p. m., March 18—"A New Era for the South." Dr Charles W. Stiles. The speaker will describe the methods by which science and money hope to eradicate the hookworm or "lazygerm."

Friday, 8.15 p. m., March 25—"The Spirit of the West." Mr C. J. Blanchard, of the U. S. Reclamation Service. The wonderful agricultural development of the West since the work of irrigation was started by the Government and private enterprise. Illustrated and moving pictures.

Friday, 8.15 p. m., April 1—"Patagonia to Paraguay—or the Story of Argentine." Mrs Harriet Chalmers Adams. Illustrated.

Friday, 8.15 p. m., April 8—"The Pearl Fisheries of Ceylon." Dr Hugh M. Smith, Deputy Commissioner, U. S. Bureau of Fisheries. Illustrated.

Friday, 8.15 p. m., April 15—"Nearest the South Pole." Lieutenant E. H. Shackleton. Illustrated.



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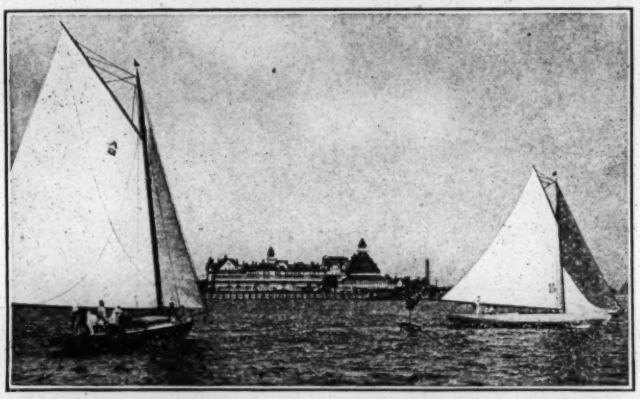

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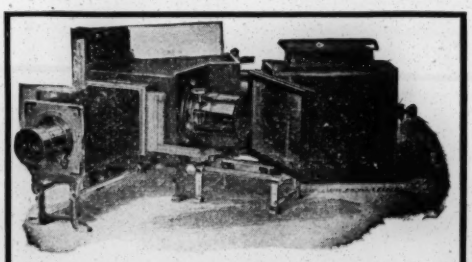

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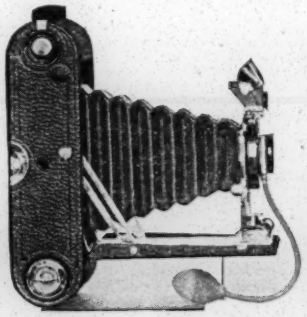

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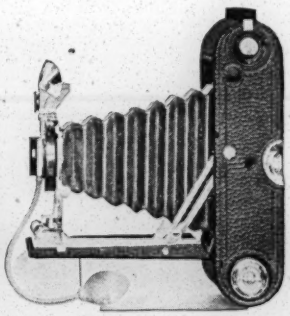

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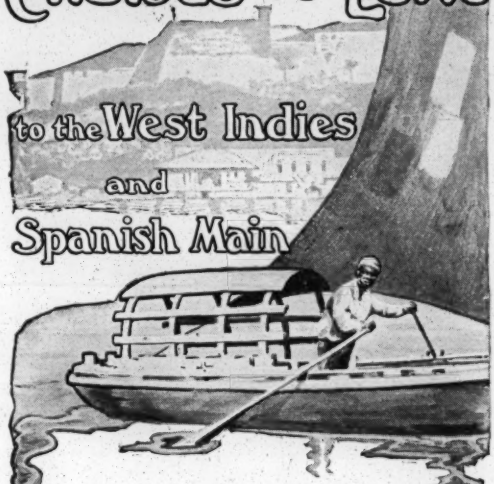

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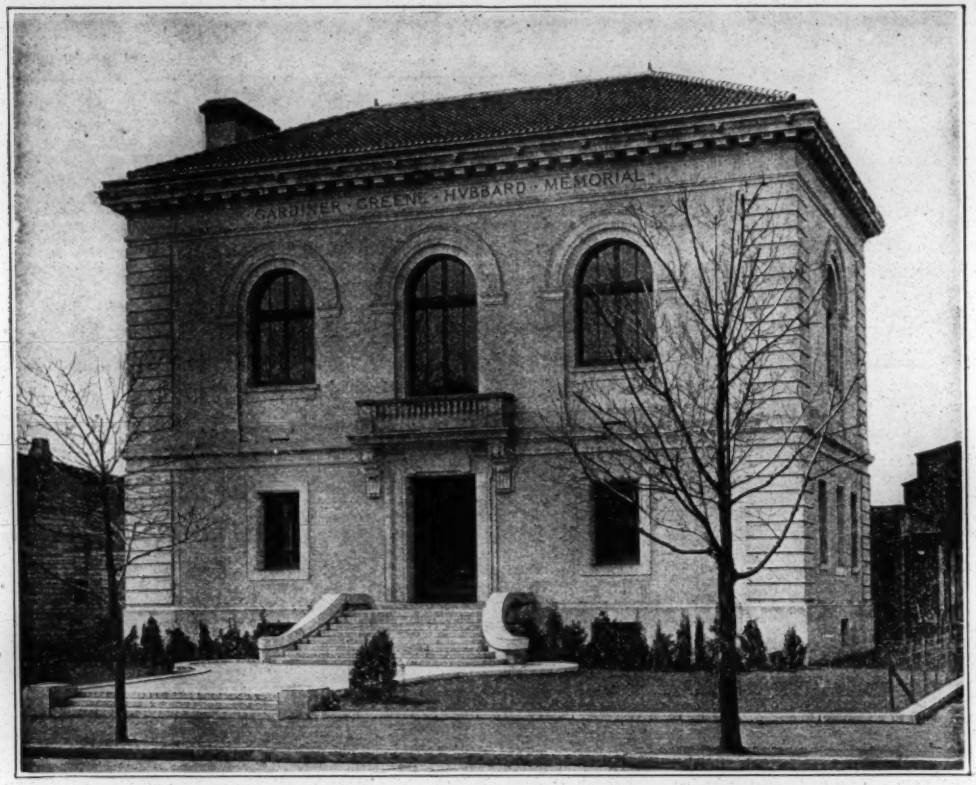

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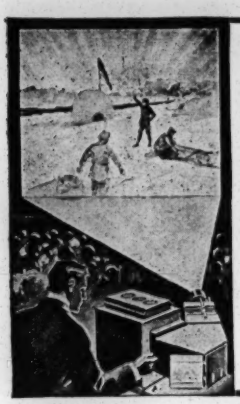

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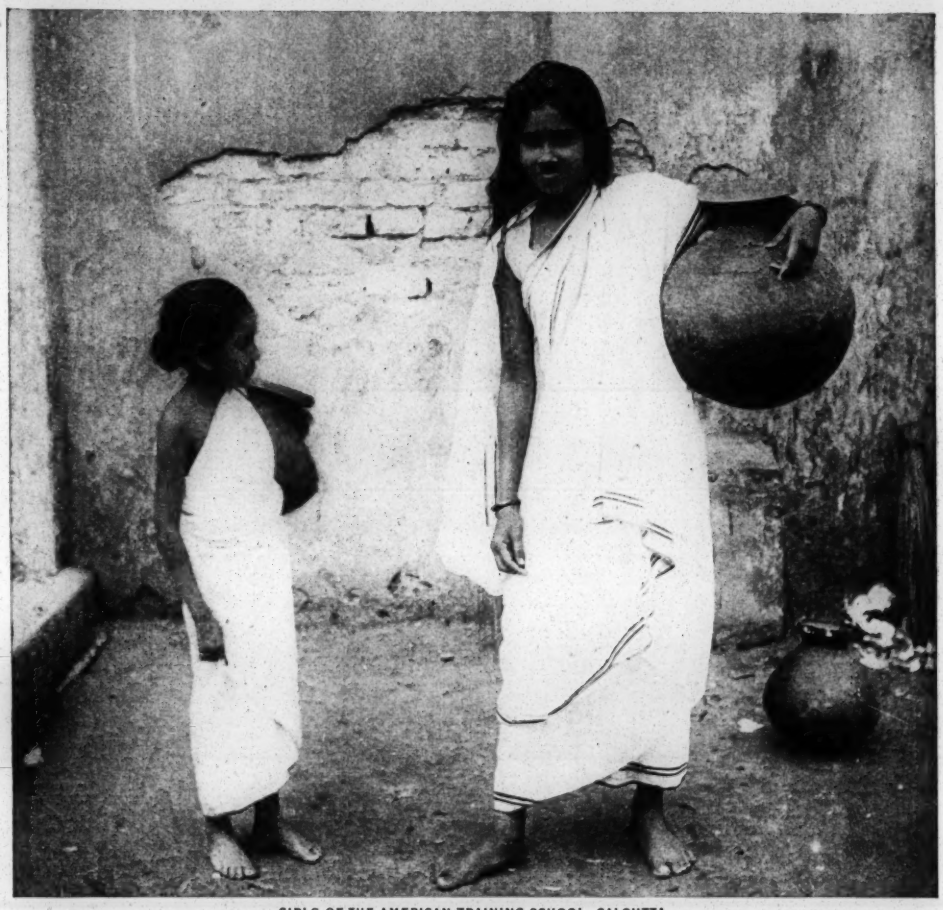

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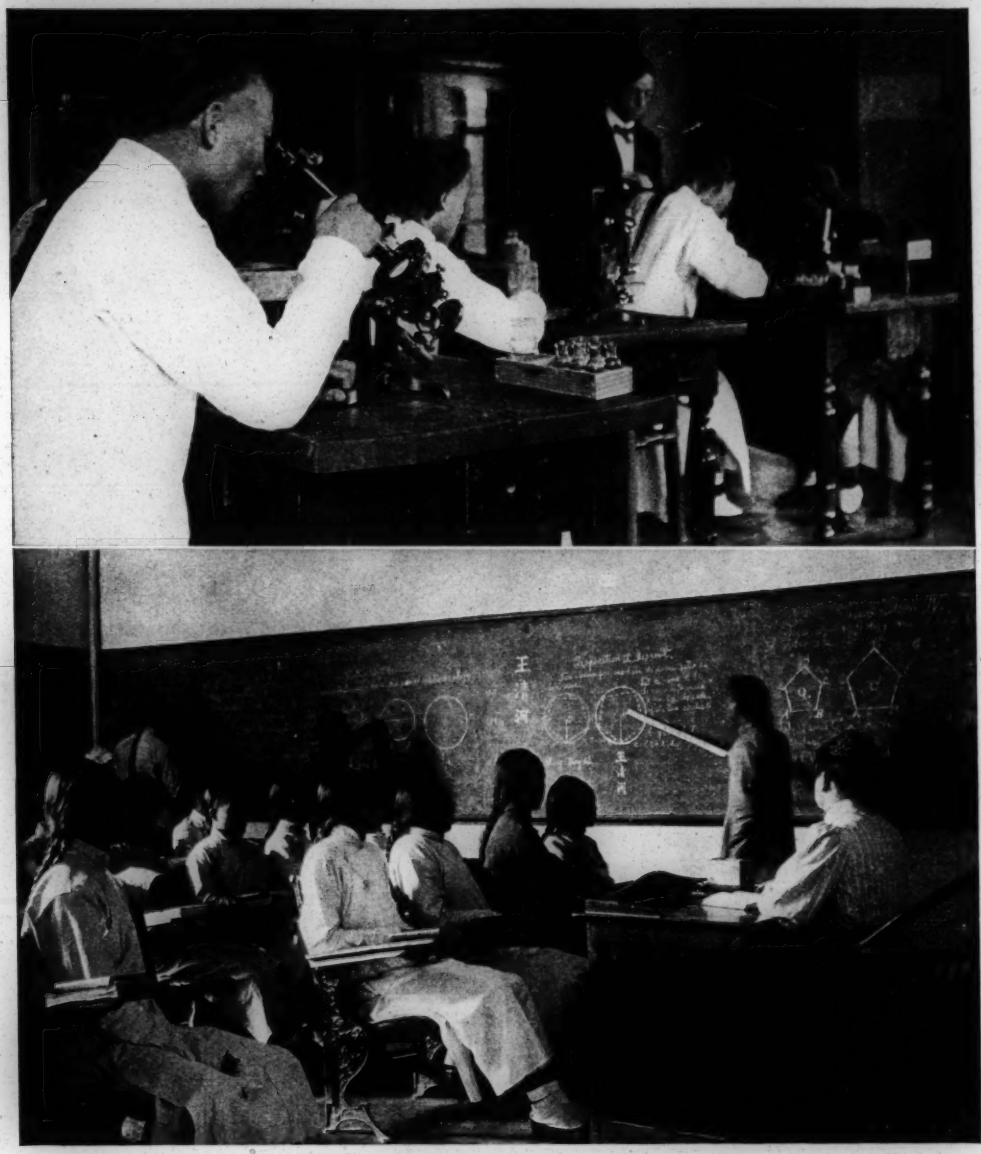

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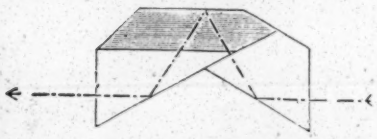

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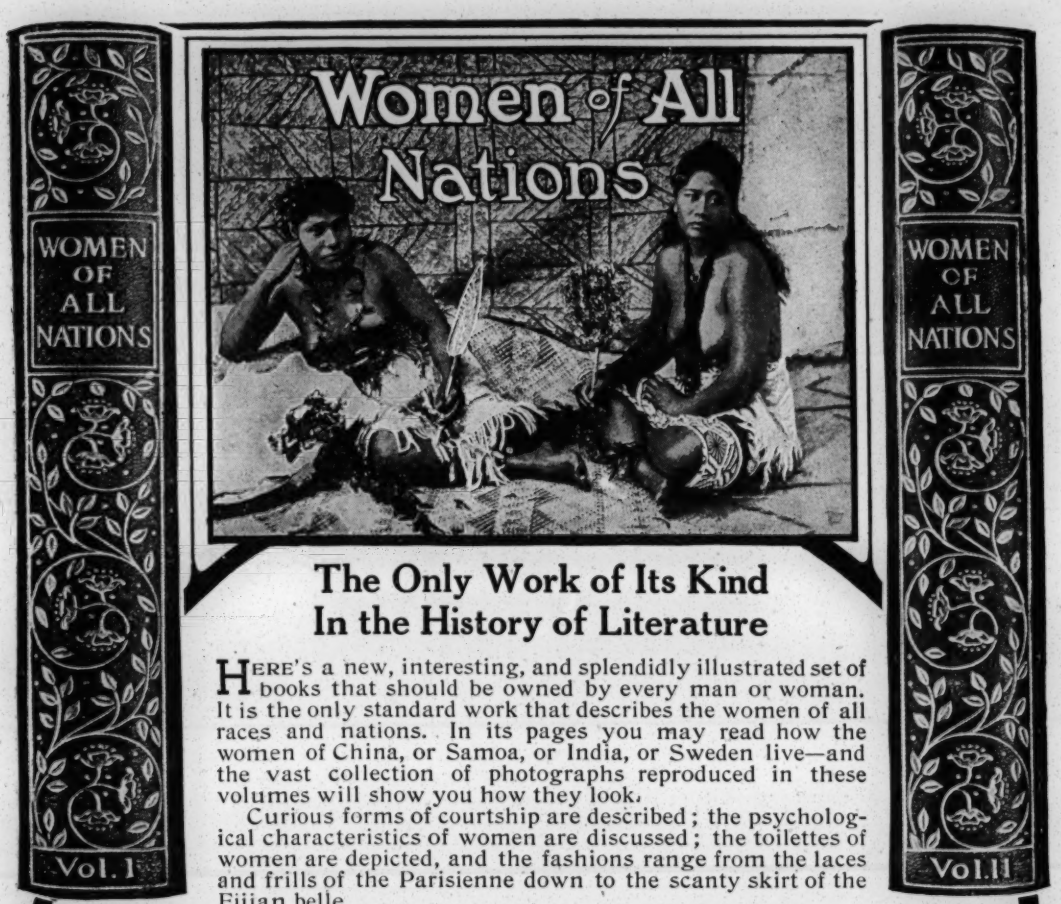

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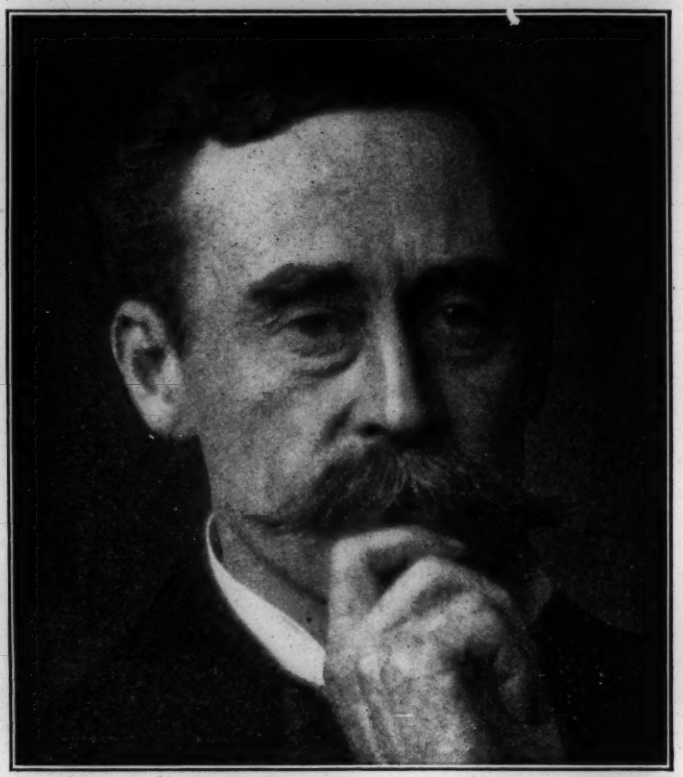

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